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ABSTRACT

A finding in the 1975-76 evaluation of several California programs designed to improve the academic achievement of young children indicated that in schools whose students scored at or below the twentieth percentile on the Entry Level Test in 1973-74, third grade reading test scores had declined relative to their predicted scores over the three-year period from 1973-74 to 1975-76. Although the aggregate finding for that group of schools indicated a decline in scores relative to prediction, individual schools could be identified that had patterns of scores that increased over the period in question, as well as schools in which scores declined. This study was designed to investigate the circumstances associated with this decline or improvement in third-grade reading achievement. Seven "increaser" schools and seven "decreaser" schools were identified, and a total of 45 third-grade classrooms were observed. Reading test scores from the California State Assessment of 1976 and 1977 and attendance data were obtained for the year. Major findings included the following: (1) higher classroom gains were associated with lower teacher-student ratios; (2) highly controlled classroom environments using systematic instruction and much positive reinforcement contributed to greater reading achievement scores; (3) small group instruction was more efficient and effective in increasing reading achievement than was individualized instruction; and (4) great classroom diversity was observed in terms of instructional processes and achievement gains. Appendices include the classroom observation instrument, and operational definitions for the observation instrument. (Author/DB)

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EARLY CHILDHOOD EDUCATION CLASSROOM EVALUATION

November 1977

Prepared for:

Office of Program Evaluation and Research
Department of Education
State of California
Sacramento, California 95814

Agreement No. 7499

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EARLY CHILDHOOD EDUCATION CLASSROOM EVALUATION

January 1978

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SRI Project 6195

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We thank Dr. Eleanor Maccoby of Stanford University for reviewing our report. We sincerely appreciate her recommendations which greatly improved the overall clarity and organization.

Also, we thank the principals and teachers in our sample who welcomed us into their classrooms. It was our privilege to spend time with them. We sincerely hope the findings from the study will be helpful to them.

ABSTRACT

A finding in the 1975-76 Evaluation of ECE, ESEA, Title I, and EDY Study (California State Department of Education, Office of Program Evaluation and Research) indicated that in schools whose students scored at or below the twentieth percentile on the Entry Level Test in 1973-74, third grade reading test scores had declined relative to their predicted scores over the three-year period from 1973-74 to 1975-76. Although the aggregate finding for that group of schools indicated a decline in scores relative to prediction, individual schools could be identified that had patterns of scores that increased over the period in question, as well as schools in which scores declined. A question of interest became, "What circumstances are associated with decline or improvement in third-grade students' reading achievement?"

To address this question, seven schools were identified as "increaser" schools and seven as "decreaser" schools. Within these schools, a total of 45 third-grade classrooms were observed. Reading test scores from the California State Assessment of 1976 and 1977 and absence data for the year were obtained. The analysis of these data suggests that children are absent less often in classrooms that have a lower ratio of children to adults and in classrooms that are academically oriented.

Correlation and regression statistics were used to study the relationships between classroom instructional processes and reading achievement and absence rate. Gain was found to be positively associated with classroom aides; i.e., when the ratio of students to adults was lower, the gain was greater. More gain was recorded in classrooms where the teachers formed small groups for instruction and used a direct or very structured method to teach. In classrooms where teachers and aides worked primarily with one child at a time the gain was very slight. In these classrooms the other children might not be receiving the guidance and feedback they need to stay on task. In classrooms where children were off task more often there was more misbehavior and less gain in reading.

Two subgroups of classrooms matched for pretest level data were identified; one group made significant gain and the other made very little gain. One-way analysis of variance was computed to examine differences in the processes used in the two groups. The findings from this analysis were similar to those of the correlations, suggesting that a direct and carefully structured approach is a more efficient one to teach reading. Also, the six teachers whose classrooms showed gain in reading scores engaged more often in the practice of asking open-ended, thought-provoking questions.

MAJOR FINDINGS

- A positive relationship was found between a higher classroom gain in third grade and a lower ratio of students to adults.

- Students were absent less often in classrooms where the ratio of students to adults was lower.

- Classroom instructional processes have been identified which contribute to greater achievement. Highly controlled classroom environments in which teachers used systematic instruction and a high ratio of positive reinforcement contributed to greater gain in third grade reading.

- Small group instruction was more efficient than working with one child at a time during the class period. In classrooms where there was little reading gain, adults tended to work more often with one child at a time and the other children did not receive the supervision and guidance needed to stay on task.

- Classrooms within schools tended to be very different from each other, both in achievement gain made by children and in the instructional processes used by the teachers.

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I INTRODUCTION

The purpose of the California Early Childhood Education (ECE) Program is to improve the education of children in classrooms from kindergarten through third grade. ECE focuses on the social, emotional, cognitive, and physical development of children. To promote the development of the whole child, the program specifies that school programs address the unique needs of each participating student. To facilitate meeting individual needs, classroom aides are provided and parent participation in the school is encouraged.

Although regulations and guidelines are promulgated by the California State Department of Education, how the program is actually implemented is determined by the individual schools. Each school presents the State Department with a plan for implementation and the State Department staff monitors and reviews the school program to see whether or not the school is carrying out the plan they have specified. While it is clear from test scores that teachers in some schools are more successful in teaching reading than those in other schools, it has not been possible to attribute this success or failure to particular program components or to particular instructional processes.

Each year the California State Department of Education's Office of Program Evaluation and Research (OPER) has identified which schools are more or less successful in improving the reading test scores of students at each grade level. Although these is great interest in which schools have the highest scores, there is even more interest in the schools that have low scores. ECE is expected to be beneficial to all students and families and school communities, but it is particularly directed toward low-achieving students. To this end, the Office of Program Evaluation identified those schools which had entry-level test scores in the lowest 20th percentile of schools when they entered ECE in school year 1973-1974. Two years later when examining these school scores, a disturbing trend was found. School scores in Spring 1976 indicated that in some schools grade three reading scores were lower than scores recorded when the school had entered the program. However, a closer look at the total set of schools which entered the program in the lowest 20th percentile revealed that some schools had rising scores. What is occurring in the schools with increasing scores that distinguishes them from schools with decreasing scores? To answer that question, in the spring of 1977 the State Department of Education's OPER commissioned SRI International to conduct a study of classrooms within these schools.

To carry out the assignment, SRI observed and systematically recorded what was happening in a sample of ECE classrooms selected from an equal number of schools with increasing scores and schools with decreasing scores, all of which were intially in the lowest 20th percentile of schools in the State Assessment Entry Level Tests. The observation system recorded the physical and affective environments as well as the classroom organization and interactions of teachers and students. The observation technology that was employed had been previously developed and used effectively to study a national sample of Follow Through third graders who were also classified as low achievers.

The primary purpose of the present study was to identify those classroom processes related to comparatively high rates of student achievement in ECE classrooms.

II DESIGN OF THE STUDY

The California Department of Education/SRI International Study of Early Childhood Education classrooms was designed to be a replication of previous research in elementary schools; in particular, the SRI National Follow Through Evaluation (Stallings and Kaskowitz, 1974) served as a model for key aspects of the current study. In accordance with the design of the Follow Through Study, data collection procedures, instrumentation, and analytical techniques previously found to be effective were adopted for use in ECE classrooms. Full details of the sample, instrumentation, classroom observation procedures, and objectives of the analysis follow.

The Sample

Selection of Schools

Fourteen elementary schools in eleven California school districts were selected for study by staff from the Office of Program Evaluation and Research (OPER), California Department of Education. Schools were selected on the basis of their participation in the state-funded Early Childhood Education (ECE) Program,* although all schools receive additional categorical program support and eight of the fourteen schools receive both federal ESEA Title I and state Educationally Disadvantaged Youth (EDY) program funds.

The objectives of the study required that the eventual sample of ECE schools be dichotomized along an achievement dimension; that is, that half of the schools have increasing reading achievement scores and half decreasing scores.

The criteria for decreasing-score schools were as follows:

(1) Schools must have been in the lowest 20% on the Entry Level Test (ELT) in 1973-74.

---

* The following discussion of selection criteria is taken from a description provided by OPER staff; for a more detailed description of the selection process, see the "Interim Report: OPER Study of ECE Schools," California Department of Education, Sacramento, CA, (1977).

(2) A school's third-grade reading scores must have been lower in 1975-76 than before the school's entrance into ECE.

  (a) For Phase I schools (those which entered ECE in 1973-74) the 1972-73 percentile rank had to be lower in Spring 1976 than in Spring 1973.

  (b) For Phase II schools (those which entered ECE in 1974-75) the 1973-74 percentile rank had to be lower in Spring 1976 than in Spring 1974.

(3) A school's third-grade scores must have decreased at least four raw score points from 1973-74 to 1975-76.

(4) A school's third-grade mean score on the California State Assessment Reading Test must have been below its prediction band in 1975-76.

(5) A minimum of 20 third-grade students must have been tested in 1975-76.

The criteria for increasing-score schools were as follows:

(1) Schools must have been in the lowest 20% on the ELT in 1973-74.

(2) A school's third-grade reading score must have been higher in 1975-76 than before the school's entrance into ECE.

  (a) For Phase I schools, the 1972-73 percentile rank had to be lower than the 1975-76 percentile rank.

  (b) For Phase II schools, the 1973-74 percentile rank had to be lower than the 1975-76 percentile rank.

(3) A school's third-grade score must have increased at least four raw-score points from 1973-74 to 1975-76.

(4) A school's obtained reading score on the California State Assessment Reading Test must have been within or above its prediction band in 1975-76.

(5) A minimum of 20 third-grade students must have been tested in 1975-76.*

Schools within the decreasing-score and increasing-score categories were then classified as either low or high bilingual. If their bilingual percentile rank on the California Assessment Program Bilingual Index was below the 75th percentile in the distribution of all schools in the state, the school was classified low bilingual; if the school was above the 75th percentile it was classified high bilingual. The final sample of schools was then chosen randomly within each of the four categories (decreasing high bilingual, decreasing low bilingual, increasing high bilingual, and increasing low bilingual) to produce a balanced distribution of bilingual students.

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* "Interim Report OPER Study of ECE Schools," California Department of Education, Sacramento, California (1977).

Selection of Teachers

Once the State Department of Education (SDE) had identified sample schools, SRI assumed responsibility for establishing contact with district and school officials and for the recruitment of classroom teachers. Phone calls were placed to district officials designated by the SDE as contacts for the study; in most cases, these individuals were directors of State and Federal projects or directors of research and evaluation. One district declined to participate because of the press of local activities; a replacement district and school were then drawn by SDE staff and contacted regarding the study. With this one exception, district officials displayed interest in the study and volunteered to contact principals of participating schools in their respective districts.

Follow-up calls to the principals were then made to describe the study and to arrange a date for a visit to SRI project staff.* Third-grade teachers at each school were notified of the study and invited to the introductory informational meeting with SRI staff. At this meeting the project was described and compared to previous and current teacher effectiveness research. Teachers were told of the demands that would be made on their time and services during the study and of the benefits they could expect at its conclusion.

A variety of factors were responsible for eventual teacher acceptance of the study at the different sites. To enlist support at some schools, emphasis was placed on the value of the results (identification of efficient classroom processes) and on the limited amount of classroom intrusion required for data collection. At other sites, it was necessary to emphasize confidentiality of data, SRI's independence from the State Department of Education, and the importance attached to the project by the school principal and district officials.

This round of discussions resulted in the recruitment of the targeted number (three) of third-grade teachers from each school with the following exceptions: one school where we expected six teachers had only four third-grade teachers (all of whom participated); at two other schools four teachers instead of three wanted to participate and we felt it would be unfair to exclude one arbitrarily; and one school had only two third-grade classrooms. Two teachers in different schools were sick during data collection activities and were unable to be present for the observations in their classrooms. The initial sample and the reduced sample distributions are presented in Table 1.

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* Principals and teachers were not told in which category their school was placed.

Descriptions of Participating Sites

Descriptions of the sample have been developed with data collected from a number of sources: classroom observation instruments, categorical program applications and evaluations on file at the SDE, and the California Assessment Program. These data are summarized in Table 2. Descriptions of the data and comparisons between sample statistics and statewide values on the variables follow; summary statistics for the sample values are shown in Table 3.

Size of School

The size of schools in the sample range from 345 students to 1107 students. Despite this wide range, the sizes of the mean and standard deviation suggest that most of the sample schools are within a comparatively narrow enrollment range of 500 to 800 students; for schools with seven or nine grade levels, the size differentials of same-year cohorts (e.g., third grade) are significantly reduced. In fact, all but two outlying schools lie in a third-grade enrollment range of from 75 to 110 students. These data support earlier subject assessments of substantial homogeneity in the sample across size of site, type of school and size of third-grade cohort variables. This conclusion holds for all but two or three large inner-city schools that are outliers.

Percentage Low Income

Sample selection criteria (see Sample Section) ensured that the attendance areas chosen would contain substantial percentages of low-income families. The fourteen schools are distributed relatively evenly over the sample, which ranges from a low of 18% low income in San Francisco to 68% low income in Long Beach. If anything is surprising in these numbers, it is that the mean percentage of low-income families for this low-achieving group is less than 40%.

Percentage Limited- and Non-English-Speaking Students

There is one site where no students qualify as limited- or non-English-speaking (LES/NES) and four others where 6% or less of the student body is LES or NES. On the other hand, several sites have substantial

Table 1

DISTRIBUTION OF SAMPLE

Initial Sample			Reduced (Final) Sample		
No. of Teachers	No. of Sites	Total	No. of Teachers	No. of Sites	Total
2	1	2	2	3	6
3	9	27	3	7	21
4	3	12	4	3	12
5	0	0	5	0	0
6	1	6	6	1	6
	14	47		14	45

Table 2

DESCRIPTORS OF SAMPLE SCHOOLS AND STATE PERCENTILE RANKS

School	School Size (Number of Students) (1)	Percent Low Income (2)	Percent Limited- and Non-English Speaking (3)	Mean ELS Score (4)	Socio-economic Status Index (5)	Percent AFDC Children (6)	Percent Bilingual (State) (7)	Mobility Index (8)	Number of Primary Languages Other Than English (9)	Length of Principal's Tenure (Years) (10)
School 101* Value (Rank)	714	37	3	24.97 (17)	1.84 (23)	25.0 (83)	39.9 (86)	33.2 (43)	4	10+
School 201* Value (Rank)	727	44	2	26.27 (28)	1.96 (34)	48.3 (96)	4.9 (26)	37.5 (60)	1	3
School 301 Value (Rank)	661	22	28	19.32 (1)	1.86 (25)	17.4 (70)	61.7 (95)	43.8 [illegible]	5	1
School 302 Value (Rank)	918	17	25	23.69 (10)	1.95 (33)	15.7 (66)	59.7 (94)	40.5 (70)	9	10+
School 401* Value (Rank)	735	68	[illegible]	20.38 (2)	1.14 (1)	75.4 (99)	25.4 (75)	52.6 (93)	9	3
School 501 Value (Rank)	1107	63	47	19.01 (1)	1.43 (5)	18.0 (71)	94.6 (99)	39.6 (67)	4	4
School 601 Value (Rank)	700	25	2	23.92 (11)	1.39 (4)	42.7 (54)	23.8 (73)	45.9 (84)	5	4
School 602 Value (Rank)	869	38	0	24.30 (13)	1.41 (5)	46.8# (96)	2.5 (15)	29.2 (28)	2	5
School 603* Value (Rank)	672	48	6	24.03 (12)	1.32 (8)	46.8 (96)	9.0 (44)	34.3 (47)	1	10+
School 701 Value (Rank)	519	21	33	20.94 (3)	1.35 (3)	13.5 (60)	57.8 (94)	34.8 (50)	1	5
School 801* Value (Rank)	667	30	0	23.48 (9)	1.61 (11)	18.1 (72)	64.3 (95)	29.4 (29)	1	4
School 901* Value (Rank)	483	36	15	25.75 (23)	1.50 (7)	25.7 (84)	56.3 (93)	42.0 (75)	3	2
School 1001* Value (Rank)	359	18	29	27.33 (41)	2.61 (73)	17.6 (71)	34.6 (83)	18.5 (4)	7	4
School 1101 Value (Rank)	343	38	5	24.61 (15)	1.32 (8)	47.9 (96)	16.8 (64)	40.0 (69)	2	1

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* "Increaser" schools; all others are "decreaser" schools.

** State percentile rank

# 1975-76 data

Sources:	Columns 1 and 10	California Public School Directory
	Columns 2-3	Consolidated Applications
	Columns 4-8 --	California Assessment Program
	Column 9	Consolidated Evaluation

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Table 3

SAMPLE VALUES ON SCHOOL-LEVEL VARIABLES

Variable	$\bar{X}$	S.D.	Range	Median
School size	678.2	208.4	345-1107	686.0
Percent low income	38.9%	17.6%	17-68%	37.0%
Percent limited- and non-English-speaking	15.2%	15.3%	0-47%	10.5%
Mean Entry-Level Test score*	23.4	2.57	19.0-27.3	23.87
Socioeconomic status index	1.63	.33	1.14-2.41	1.52
Percent with Aid for Families with Dependent Children	32.8%	18.5%	13.5-75.4%	25.4%
Percent bilingual*	39.4%	27.2%	2.5-94.6%	37.3%
Mobility index*	37.2	8.4	18.5-52.6	38.6
Number of primary languages other than English	3.9	2.9	1-9	3.5
Number of years tenure of principal	---	---	1-10+	4

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* Index developed by California Assessment Program, State Department of Education. For description, see Interpretive Supplement to the Report on the Reading Test, Second and Third Grades, 1977, California Assessment Program, Sacramento, CA, State Department of Education (1977).

LES/NES populations, including one where nearly one of every two children is in that category. For this reason, the distributional statistics must be interpreted with caution (for example, the standard deviation is almost as large as the sample mean). The sample can more appropriately be divided into two groups: one in which the proportion of LES/NES students is considerably greater than in the general population and where these students have a major impact on the cultural and educational environment of the school, and a second group of schools in which the students are only a small percentage of the population.

Mean Entry-Level Test

The Entry-Level Test is given to all first grade children in the state. For the most part, the relative position of the entry level for first graders in our sample of schools did not change substantially in 1976-77 from the level of entry scores reported for first graders in 1973-74. Three schools, however, have moved well above the lowest 20% of schools in the state. One school's mean score changed so much that the 1973-74 score must either be considered an anomaly or must signify a change in the composition of the student body. The range across the sample is not great, especially when the outlier school is removed from calculation of descriptive statistics ($\overline{X}$ = 23.13, S.D. = 2.41).

SES Index

School values on this measure range from a low of 1.14 (1st percentile) to 2.41 (23rd percentile). Again, standard distributional statistics are misleading here because of the wide range and nonsymmetrical distribution of the variable values. There is again an outlier, clearly not typical of the rest of the schools. The remaining schools tend to group themselves into two categories: the nine schools at or below the 10th percentile in the state, and four that range from the 25th to 33rd percentiles. Thus, there are significant differences from school to school on this measure, and no single statistic captures this diversity. It should be noted that the degree of this diversity is difficult to explain in the face of relative homogeneity across sample schools on achievement measures and percentages of children from low-income families discussed earlier.

Percentage Aid to Families with Dependent Children (AFDC)

Values on this variable ranged from a low of 13.5% to a high of 75.4%, with the schools clustering at two different levels: eight schools had 13-25% AFDC, while five others had between 40% and 50%. The high percentage of 75% is a single outlier with substantially more AFDC children than the nearest school.

Interpretation of this measure is difficult, however, because of the established relationship between racial/ethnic status and propensity to apply for welfare. Thus the measure is not a good proxy for SES, and it is not strongly associated with seemingly comparable SES measures.

Percentage Bilingual

This variable was used as one of the stratifying factors in the sample selection, and thus is a dimension of more than average interest. Both the range (2.5% to 94.6%) and the standard deviation (27.2) were quite large on this measure, suggesting wide variability among sites. Closer inspection, however, reveals that three schools have comparatively small bilingual populations while the remaining eleven schools have large populations that place those schools well beyond the state average. Thus, much of the variability appears to be within a range where a subpopulation exerts a significant influence on the environment of a school, and in which differences of even ten percentage points in student body composition mark differences of degree and not differences of kind.

Mobility Index

Student mobility is a long-standing complaint of teachers at low-income schools, who often see a seat in their classroom filled by three or four different students in the course of a year. This problem is compounded for our sample schools by two characteristics of the state of California: its overall high transiency rate (which is the product of complex social factors) and the agricultural orientation of the state economy.* The data confirm the seriousness of this problem: eight of the fourteen schools are well above the median state school value, and three others are very close to the state median. One surprise, however, was the finding that three participating schools have extremely stable populations, in one case at a school with a very low SES ranking. However, the overall picture confirms observations in previous studies that schools with low-income/low-achieving student bodies tend to have greater student mobility than other categories of schools.

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* Three schools are in agricultural areas and others may receive transient children during the period when farmwork is scarce.

Number of Primary Languages Other than English

This measure is provided to complement the percent of LES/NES and percent of bilingual indices, since two populations of students with roughly the same percentages of LES/NES students pose very different instructional problems if their subpopulations vary in the number of languages they speak. For example, it would seem that one school, where students speak seven primary languages in addition to English, presents a challenge different from that faced at a school where the only primary languages are English and Spanish. This difference appears despite the fact that the first school's percentage of LES/NES children is lower than that at the second.

The range of languages over the sample is from one to nine; the relatively high mean and standard deviation strongly suggest that one possible source of the low achievement scores of children at these schools is a language barrier between them and the dominant English-speaking culture.

Number of Years Tenure of Principal

Since turnover of key staff is a problem reported by some schools with low-income students, we decided to examine the extent to which these schools experienced a change of principals. The results were encouraging; though no statewide comparison data were available for this report, sample schools appear to almost uniformly attract individuals who are willing to stay and lend a measure of stability to an otherwise fluid situation (see mobility index). This finding, coupled with our overall subjective assessment of principals we met as conscientious, competent educators, lends one note of encouragement to the future of these schools.

The Observation Instrument

The classroom observation instrument and procedures developed by SRI for use in the evaluation of the National Follow Through programs provides a systematic way for observation data to be reliably recorded. The data were then used to assess the extent of implementation of sponsors' models and to examine the relationship of classroom process to child outcomes.

The SRI Classroom Observation Instrument is structured to provide a description of activities and interactions that occur in classrooms. (See Appendix A for a copy of the instrument and operational definitions.) Through the use of well-defined codes, it yields a record of classroom activities, the physical environment, the organization of groups, and the interactions between the teacher, aides, and children.

The Classroom Observation Instrument (COI) contains three major sections:

- The Classroom Summary Information (CSI) section.

- The Physical Environment Information (PEI) section.
- The Classroom Observation Procedure (COP), which consists of three parts: the Classroom Check List (CCL), Five-Minute Observation Preamble (PRE), and Five-Minute Observation (FMO).

In a single observation day, the CSI and the PEI are completed once, and the COP (which includes the CCL, the PRE, and the FMO) is completed four times an hour for five hours a day. From these coded data, variables are formed which describe classroom instructional processes. (See Appendix B for a list of the variables.)

Classroom Summary Information (CSI)

The Classroom Summary Information section is designed to allow for the coding of the number of children enrolled and the number present on the observation day; the number of teachers and aides assigned to the classroom; and the number of volunteers or visitors present on the observation day. Also recorded in this section is the length of the school day.

Physical Environment Information (PEI)

The Physical Environment Information section provides space for coding information about the classroom setting, which includes the presence and use of specific equipment, instructional materials, games, toys, and displays in the classroom. The observer also records whether the classroom has movable tables and chairs and/or stationary desks in rows, whether seating is assigned during part of the day and/or self-selected, and whether children are assigned to groups by the teacher or aide and/or select their own work groups.

Classroom Observation Procedure (COP)

The COP consists of three sections of codes that describe the classroom structure and process:

- Classroom Check List (CCL)
- Five-Minute Observation Preamble (PRE)
- Five-Minute Observation (FMO).

The classroom observer completes the entire COP--the CCL, the PRE, and the FMO--approximately four times an hour or 16 to 20 complete COPs over a 4- to 5-hour observation day.*

Classroom Check List (CCL)

As noted above, the Classroom Check List (CCL) is completed approximately four times an hour. The CCL is referred to as a "snapshot" of the classroom because it allows for coding relatively stable "pictures," at a given point in time, of the activities engaged in and the distribution of the adults and children in the classroom. A record is made of activities occurring, of child and adult grouping patterns, of adult roles, of child involvement, and of the materials used in the academic activities. For example, several activities may be taking place simultaneously in the classroom: a small group of children may be doing crafts under the guidance of a teacher aide, the teacher may be instructing a large group (over eight children) in reading, three children may be working independently on a science project, and four children may be using trucks and blocks in independent play. All of these activities and the individuals involved in each would be recorded on the CCL (see Figure 1).

The Five-Minute Observation Preamble (PRE)

The FMO Preamble is designed to record information about the activity that the preselected focus person--whether child or adult--is actually engaged in (see Figure 2). This is done four times an hour. The observer focuses on the selected person just before the five consecutive minutes of observation begins and records: whether the focus person is an adult or child and his/her identification number; the CCL code number for the activity engaged in; the role of the adult--that is, whether the teacher, aide, or volunteer is observing, participating, or directing the activity, or not involved; the number of children involved; whether the activity in progress is a continuation of the previously observed activity (i.e., the preceding FMO); and the time the FMO was started. If, during the five-minute observation period, there is a change in the activity in which the focus person is engaged, the observer records the activity actually taking place at the end of the time period in the designated space at the end of the FMO.

---

* The number of observations cannot be firmly fixed because the class day is shorter for some schools and some hours are interrupted by out-of-classroom events.

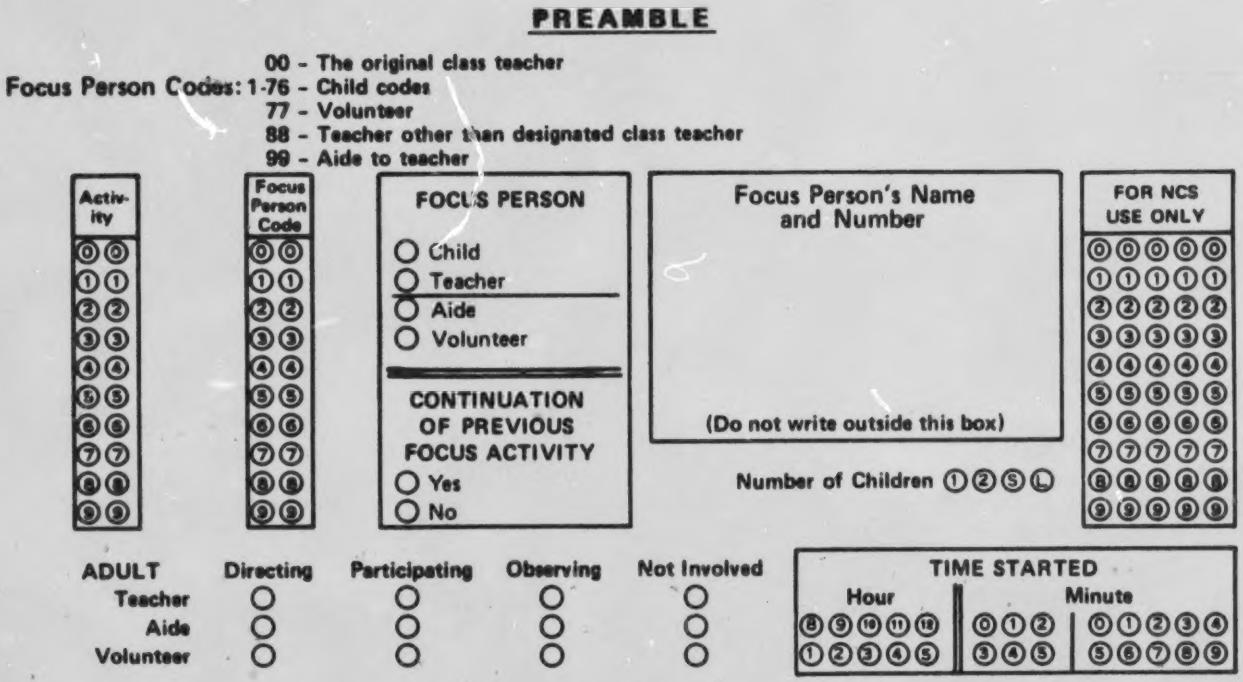
CLASSROOM CHECK LIST (be sure to code EVERYONE in the class)

			ONE CHILD	TWO CHILDREN	SMALL GROUPS	LARGE GROUPS
1. Snack, lunch			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
2. Group time			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
3. Reading Out Loud			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
4. Arts, Crafts			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
5. Reading Silently			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
○ TV ○ Audio-Visual Materials ○ Exploratory Materials ○ Math and Science Equipment ○ Texts, Workbooks ○ Puzzles, Games	6. Numbers Math Arithmetic		T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
	7. Reading Alphabet Lang. Development		T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
	8. Social Studies Geography		T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
	9. Science Natural World		T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
10. Drill on Practice			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
11. Blocks Trucks			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
12. Dramatic Play Dress-Up			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
13. Active Play Music, Dancing			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
14. RELIABILITY SHEET		○				
15. Practical Skills Acquisition Sewing, Cooking, Pounding, Sawing			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
16. Observing			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
17. Social Interaction	Ob [① ② ③]	Ⓣ	T ①②③	T ①②③	T ①②③④	T ①②
		Ⓐ	A ①②③	A ①②③	A ①②③④	A ①②
		Ⓥ	V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
18. Unoccupied Child			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
19. Discipline			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
20. Transitional Activities		Ⓣ	T ①②③	T ①②③	T ①②③④	T ①②
		Ⓐ	A ①②③	A ①②③	A ①②③④	A ①②
		Ⓥ	V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
21. Classroom Management		Ⓣ	T ①②③	T ①②③	T ①②③④	T ①②
		Ⓐ	A ①②③	A ①②③	A ①②③④	A ①②
		Ⓥ	V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②
22. Out of Room		Ⓣ	T ①②③	T ①②③	T ①②③④	T ①②
		Ⓐ	A ①②③	A ①②③	A ①②③④	A ①②
		Ⓥ	V ①②③	V ①②③	V ①②③④	V ①②
			I ①②③	I ①②③	I ①②③④	I ①②

NUMBER OF ADULTS IN CLASSROOM ⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

FIGURE 1 CLASSROOM CHECK LIST

FILMED FROM
BEST COPY AVAILABLE



PREAMBLE

Focus Person Codes:
00 - The original class teacher
1-76 - Child codes
77 - Volunteer
88 - Teacher other than designated class teacher
99 - Aide to teacher

Activity	Focus Person Code
⓪ ⓪	⓪ ⓪
① ①	① ①
② ②	② ②
③ ③	③ ③
④ ④	④ ④
⑤ ⑤	⑤ ⑤
⑥ ⑥	⑥ ⑥
⑦ ⑦	⑦ ⑦
⑧ ⑧	⑧ ⑧
⑨ ⑨	⑨ ⑨

FOCUS PERSON
○ Child
○ Teacher
○ Aide
○ Volunteer

CONTINUATION OF PREVIOUS FOCUS ACTIVITY
○ Yes
○ No

Focus Person's Name and Number

(Do not write outside this box)

Number of Children ① ② Ⓢ Ⓛ

FOR NCS USE ONLY
⓪ ⓪ ⓪ ⓪ ⓪
① ① ① ① ①
② ② ② ② ②
③ ③ ③ ③ ③
④ ④ ④ ④ ④
⑤ ⑤ ⑤ ⑤ ⑤
⑥ ⑥ ⑥ ⑥ ⑥
⑦ ⑦ ⑦ ⑦ ⑦
⑧ ⑧ ⑧ ⑧ ⑧
⑨ ⑨ ⑨ ⑨ ⑨

ADULT	Directing	Participating	Observing	Not Involved
Teacher	○	○	○	○
Aide	○	○	○	○
Volunteer	○	○	○	○

TIME STARTED

Hour	Minute	
⑧ ⑨ ⑩ ⑪ ⑫	⓪ ① ②	⓪ ① ② ③ ④
① ② ③ ④ ⑤	③ ④ ⑤	⑤ ⑥ ⑦ ⑧ ⑨

FIGURE 2 FIVE-MINUTE OBSERVATION PREAMBLE

The Five-Minute Observation (FMO)

The last part of the COP, the Five-Minute Observation (FMO), is coded four times an hour immediately after the Preamble and is used to record interactions among people in the classroom. The activities of one person, the selected focus adult or child, are recorded throughout the 5-minute observation period.

The FMO consists of 76 frames, with four sections in each frame, specifically for recording four types of categories: "Who does the action?" "To whom is it done?" "What is done?" and "How is it done?" These categories are coded in sequence to form a sentence (subject, verb, object), which represents an interaction. The subsequent frame is used to code a response (if any) or, in the case of a one-way communication (such as a teacher lecturing or a child manipulating materials), continues to describe the primary action of the focus person. The FMO observations are structured as a language, with the codes forming intelligible sentences. The Who and To Whom codes are used to designate the participants in an interaction. These codes make it possible to designate the person or group of persons initiating or receiving an action; for example, the letter "T" can be used to designate the teacher as the initiator ("Who") or as the receiver ("To Whom") of the interaction. An Aide (A), a child (C), a group (G), or a machine (M) can be used in the Who or To Whom column. (See Appendix B for the "Who" and "To Whom" codes.)

The What codes are used to designate the kinds of interaction--such as questions, answers, or reprimands--that have occurred between the participants. The How column codes are modifiers. They supply descriptive information about the initiator in the Who column or the statement made in the What column; that is, the How column can describe positive or negative affect, or control systems, or the subject matter of the statement.

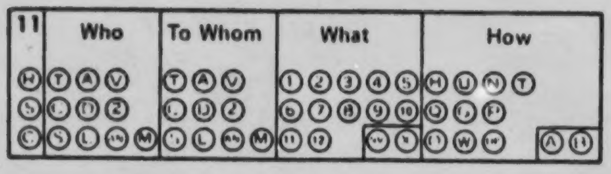
Examples of coded frames are shown in Figure 3. They demonstrate how the Who, To Whom, What, and How codes can be strung together to form interaction sentences.

Selection and Training of Classroom Observers

Selecting Classroom Observers

Because the classroom observers collect the data to be analyzed, their selection and training are of critical importance to the success of the study. The selection process emphasized the following qualities and qualifications:

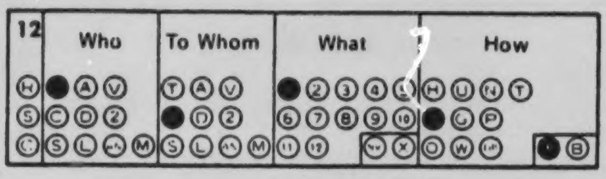
- Personal ability--The observers were expected to learn rapidly, retain information, and build concepts around given symbols.



A complete interaction sequence will take two or more frames showing at least the initiation of an interaction and the response to that initial interaction. An example of an interaction sequence is shown below.

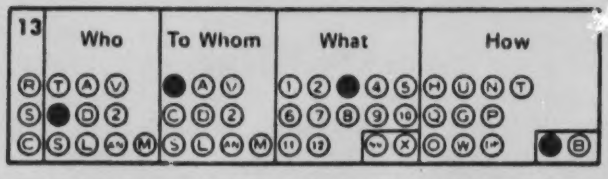
Teacher: "Johnny, what is 9 x 12?"

The teacher (T in the Who column) is initiating an interaction with a child (C in the To whom column) by asking a simple question (1Q in the What and How columns). (A more detailed explanation of the codes appears in Appendix D.) This is coded in shorthand as TC1QA. It is coded in the frame as shown below.



Johnny: "108."

Johnny (C in the Who column) responds (3A in the What and How column) to the teacher (T in the To whom column). This in shorthand is CT3A. It is coded in the frame as shown below.



Teacher: "That is correct, Johnny."

The teacher (T in the Who column) tells Johnny (C in the To whom column) that she acknowledges (7A in the What and How column) his correct response. This in shorthand is TC7A. It is coded in the frame as shown below.

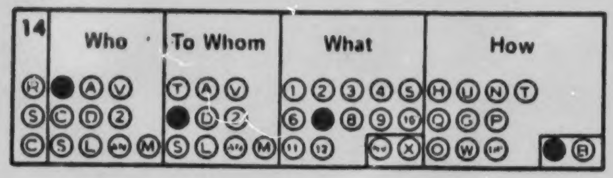


FIGURE 3 CODED FMO FRAMES SHOWING CODING OF A TYPICAL INTERACTION

- Education--A college degree was considered desirable but not essential. Applicants with training in specific educational approaches were considered, but with caution, because they might subjectively evaluate classroom events.

- Attitude--Observers were expected to have a professional attitude towards the data collection effort, which included objectivity in dealing with the data and the ability to treat all data as confidential.

- Experience--The observers were required to have had some experience in working with children.

These criteria were used to select four classroom observers. Two of these observers had recently observed using the same SRI Classroom Observation Instrument for the Teacher Effectiveness Study at Stanford University. The other two observers did not have previous observing experience, but both had the educational qualifications and had participated in field-based research studies.

Observation Training

All four observers were given pretraining materials to study prior to attending the training session. Trainees are expected to arrive on the first day of training with a knowledge of the codes and a general understanding of the system.

The two observers who had previously been trained by SRI to collect observation data had both demonstrated competence in the use of the system. The observation system used in the Stanford study was exactly the same as that used for the present study. These two observers had been using the observation system throughout the 1975-76 school year and had been checked frequently for reliability. Therefore, it was decided that a 2-day refresher session would be sufficient training for these two observers. Immediately after completing this 2-day session, they were assigned to classrooms to conduct observations.

While these two observers were observing for the data collection, a 5-day training session was held for the other two observers who did not have previous experience with the SRI observation system.

The prevailing strategy of the training session was to expose the trainees to as many different classroom situations as possible and to allow for discussion as to how these events would be coded on the observation system.

Most of the training time consisted of showing trainees video tapes of elementary classrooms, coding the tapes with the observation system and discussing any questions or confusions which arose from the coding. On the second through fourth mornings, trainees conducted practice observations in elementary classrooms in Menlo Park/Palo Alto area. These practice observations were approximately 1.5 hours long. The trainees then returned to the training room and discussed any coding problems that arose during that time.

In addition to the coding from video tapes and the classroom observations, trainees were assigned coding exercises to complete in the evening. These were dialogues of classroom situations. Each morning the work from the previous evening was reviewed and discussed.

Throughout the training session, reliability checks were conducted. The trainees and trainer would code a video tape and a tally would be made of the frequency of each code by an individual observer. This procedure helped the trainer learn which codes required more clarification.

On the fifth morning the reliability tapes were shown. These were all tapes of classroom situations which the trainees had not previously viewed. Both observers passed the reliability test (see the following section for the reliability report).

The afternoon of the fifth day was devoted to the logistics of the study. Observers were given the observation schedules and materials required. At this time, the importance of the confidentiality of the observations was stressed. They were told not to make judgmental comments to teachers, positive or negative, regarding the environment in the classroom. Observers were instructed to inform the school administration of their schedule when they arrived at the school and to be as unobtrusive as possible in the classrooms.

Reliability Procedures

Reliability tests of the two new observers were conducted on the last day of the 5-day training session (pretest reliability). The two experienced observers were examined for proficiency during their 2-day session. The reliability of all four observers was recorded again 2 weeks after they started data collection (posttest reliability).

To examine reliability, a set of videotapes was shown. No discussions or questions regarding the coding were allowed. One set of videotapes were run at normal speed and observers were asked to code as rapidly as required to capture the behavior on the tapes. Following this, observers were shown videotapes which contained 110 freeze-frames and were asked to code the behavior occurring in the freeze frame. The same procedure was followed for pretest and posttest reliability.

The results of the observers' coding of the normal speed videotapes are shown in Table 4 for pre- and posttest reliability. Coding in this system is not regulated by timed signal. Each observer codes the interactions at his/her own speed. When interactions occur very rapidly, two observers are likely to be recording correctly but at different speeds. Therefore, a proportional frequency of codes is calculated. The total

Table 4

PROPORTIONAL FREQUENCIES OF CODES
(Normal-Speed Videotapes)

	Pretest Reliability			Posttest Reliability				
Code	Trainer	Obs. 03	Obs. 04	Trainer	Obs. 01	Obs. 02	Obs. 03	Obs. 04
T	.66	.68	.65	.68	.77	.66	.72	.63
V	.07	.04	.09	--	--	--	--	--
C	.12	.13	.15	.10	.04	.12	.08	.08
S	.15	.12	.15	.25	.19	.23	.20	.29
1	.13	.13	.14	.27	.19	.21	.27	.19
1Q	.16	.14	.15	.02	.04	.02	.02	--
2	--	--	--	--	--	--	--	--
3	.26	.28	.33	.23	.23	.25	.27	.29
4	.10	.10	.08	.13	.19	.13	.17	.13
5	--	--	.01	--	--	--	--	--
6	.03	.03	.03	--	--	.04	.02	.11
7	.07	.05	.04	--	--	--	.02	--
8	.03	.02	.03	--	--	--	--	--
9	.07	.08	.08	.08	.10	.09	.08	.15
10	--	--	--	--	--	--	--	--
11	--	--	--	--	--	--	--	--
12	.15	.18	.11	.18	.25	.23	.17	--
H	--	--	--	--	--	--	--	--
U	.03	.01	.01	.04	--	--	.03	--
N	.01	.02	--	--	.02	--	--	--
T	--	--	--	--	--	--	--	--
Q	.03	.01	.02	--	--	--	--	.03
G	.03	.02	.01	.06	.02	.04	.05	.08
P	.01	--	.03	--	--	--	--	--
O	.02	--	.08	.06	.04	--	.13	.06
W	.01	--	--	--	--	--	--	--
Dp	--	--	--	--	--	--	--	--
A	.64	.65	.59	.80	.83	.81	.82	.77
B	.10	.09	.13	.16	.10	.11	.15	.10
NV	.10	.11	.15	.18	.15	.15	.18	.31
X	.02	.19	--	--	--	--	--	--

number of times a specific code is used is divided by the total number of frames recorded. The difference in the number of frames is the denominator in computing this proportional frequency. Differences between the observer and the trainer that were greater than 10% on any code were identified.

Different videotapes were used for pre- and posttest reliability; thus a direct comparison cannot be made between the two reliability tests. Table 5 indicates that all observers were within the 10% difference in proportional scoring from the trainer.*

Results of the observers' coding of the freeze-frame videotape are presented in raw frequencies for each code on Table 5. The pre- and posttest reliability is impressive. Observers 1 and 2 have perfect agreement with the criterion on 26 out of the 30 codes, and the differences in frequency on the remaining codes is 2 or less. Observer 3 improved her scores on the posttest reliability test on four codes. Only the code for academic interactions (A) differed more than 5 frequency points, and that code is still 81% reliable. Observer 4 improved her score on 11 codes by 1 or 2 frequency points, and none of the differences between her coding of the posttest and the criterion are greater than 2 points. Over all, we conclude the data are acceptably reliable.

Interrater agreement was not computed in this study. However, in the observation study of Follow Through (Stallings and Kaskowitz, 1974) a comparison was made of reliability computed through the use of criterion videotapes and interrater agreement in the classroom. The findings from this comparison indicated that observers who coded reliably in one situation also coded reliably in the other. Natural classrooms yielded fewer codes to examine since teachers are inclined to use a limited set of behaviors. Overall, the interrater agreement of reliability tended to be slightly higher than the videotape reliability. This is probably due to the fact that it is easier to code in the natural classroom than from videotapes. Videotapes are not always clear and the total situation cannot be seen or understood.

Data Collection Procedures

The primary goal of the data collection activities was to collect data that accurately described classroom settings and teacher and student behaviors. To do this, it was important that all field activities were carried out consistently. A second concern was that schools and classrooms be disturbed as little as possible by SRI staff so that disruption of instructional activities would be minimal.

The data-gathering activities were conducted through a series of visits to each site. The schedule of visits was as follows:

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* Only posttest reliability is reported for Observers 1 and 2, since their reliability had been examined on a different set of tapes at Stanford University.

Table 5

PRETEST AND POSTTEST RELIABILITY FREQUENCIES OF CODES (Freeze-Frame Videotapes)

		Correct Codes							
		Obs. 01		Obs. 02		Obs. 03		Obs. 04	
Code	Criterion	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Who	55	--	55	--	55	53	54	52	54
To Whom	55	--	55	--	55	53	54	52	54
What--1	2	--	2	--	2	2	1	2	2
1Q	8	--	8	--	8	8	8	8	8
2	--	--	--	--	--	--	--	--	--
3	11	--	11	--	11	11	11	11	11
4	8	--	8	--	8	8	7	8	7
5	4	--	4	--	4	4	4	4	4
6	4	--	4	--	4	4	4	3	3
7	2	--	2	--	2	2	2	2	2
8	5	--	5	--	4	4	5	4	4
9	5	--	3	--	3	5	5	3	3
10	1	--	1	--	1	0	1	0	1
11	1	--	1	--	1	1	1	1	1
12	4	--	2	--	4	3	3	3	4
How--H	4	--	2	--	2	3	3	2	3
U	1	--	1	--	1	1	1	0	0
N	--	--	--	--	--	--	--	--	--
T	3	--	3	--	2	3	3	2	2
Q	3	--	3	--	3	3	3	2	3
G	2	--	1	--	1	2	2	0	2
P	2	--	2	--	2	2	2	1	2
O	3	--	3	--	3	3	3	3	3
W	2	--	2	--	2	2	2	2	2
Dp	--	--	--	--	--	--	--	--	--
A	32	--	30	--	30	26	26	8	30
B	--	--	--	--	--	--	--	--	--
NV	11	--	11	--	11	7	11	8	10
X	2	--	2	--	2	2	2	0	1
S	2	--	2	--	2	2	2	2	2

Site Visit	Major Purposes	Date
1	Introduce SRI and the study Recruit teacher for sample	March 1977
2	Classroom Observations	March-April 1977
3	Ethnographic Observations of Classrooms	April-May 1977
4	Collect attendance data	June 1977

Observation Data

All visits were coordinated with local school principals and district officials who played important roles by advising SRI of desirable times for visits and by contacting teachers in advance of those visits. At the first meeting a date was set for the next visit by the classroom observer; the data collection period was typically an entire week within which teachers chose among themselves which days would be most appropriate for observation in their respective classrooms. This procedure was used to allow for field trips, school assemblies, and other activities that took students out of the classroom. At schools with three participating teachers, 5 days were spent at the site, 2 full days each for two of the teachers and 2 full days for the third teacher. At all other schools (e.g., those with two, four, or six participating teachers), there were 2 days of observation per teacher. Each observation "day" consisted of the first 5 hours of the school day (if there were 5 hours), including recess periods and gym class but excluding lunch. Children were not observed individually, but they were all recorded on each classroom checklist.

Upon arrival at the school, each observer registered at the principal's office and confirmed the week's schedule of observations with the teachers. At this point the schedule was adjusted for last-minute changes in teacher's lesson plans. The observer then reported to the classroom 15-20 minutes before the start of class to answer any questions teachers might have and to discuss the observer's possible movement that would be necessary during the class period. Strict adherence to these procedures appears to have minimized the disruption of schools and classes. In fact, several teachers who initially had been apprehensive about being observed told our observers that participation in the study had been enjoyable and that they were looking forward to the results. To the best of our knowledge, relations between observers and school staff were cordial at all sites, and no complaints were registered concerning the data collection effort.

Several weeks after the classroom observations had been finished, the SRI project leader visited a sample of participating schools to make ethnographic observations of third grade classrooms. One day was spent at each site visited to observe and answer questions about the study from the school principal, staff specialists, or classroom teachers.

Attendance Data

A final site visit was required in four sites where the collection of class attendance data was incomplete. Some teachers were unable to provide the data before they left for the summer vacation. SRI staff visited these sites and, with the assistance of district personnel, obtained the relevant data. In the other ten sites, complete attendance data were forwarded to SRI at the end of the school year.

Test Data

Initially we intended to use the achievement test data collected by each school in Fall 1976 and Spring 1977 as our dependent variables. We thought these test scores would be available from districts long before the California Assessment Program scores could be obtained from the State Department of Education. During June and July, SRI staff contacted district directors of research to obtain the required classroom level pretest and posttest scores for Fall 1976 and Spring 1977. Although data were received from all sites, the diversity of the tests used and dissimilar district testing schedules precluded use of these scores in this analysis.

Table 6 displays the results of the effort. Three different standardized tests are used by the eleven sample districts: seven use the Comprehensive Test of Basic Skills, two use the Metropolitan Achievement Test, and two others use the Cooperative Primary Test. Standard scores for different tests could not be converted to a common scale at the third grade level because the Anchor Test Study Equivalency Scales deal only with Grades 4 through 6. Such incompatibility of scores prevents meaningful comparisons being made between districts using different tests.

An additional problem was that four districts tested only in the spring of each year. Interpolation of Fall test scores in these districts from the two Spring data points was not feasible.

For these reasons, the decision was made to use the California Assessment Program (CAP) test data as the dependent achievement measure in the analysis. CAP files were assessed to locate matched samples of children for each classroom in the study for Spring 1976 and Spring 1977. Since this request required special handling by the testing and data control personnel in the State Department of Education, these data were not obtained until late September. The data from one school and from three classes in another school were missing entirely. Although school level scores are available for those schools, the classroom scores could not be computed because the appropriate box to identify students in our study had not been marked.

Table 6

DESCRIPTION OF STANDARDIZED ACHIEVEMENT TEST DATA
(District Testing Programs)

District and Test	Spring 1976		Fall 1976		Spring 1977	
	Level	Form	Level	Form	Level	Form
District A Metropolitan Achievement Test	Pri.I	G	Pri.II	F	Pri.II	G
District B Comprehensive Test of Basic Skills	B*	S	1	S	1	S
District C Comprehensive Test of Basic Skills	C	S	1	S	1	S
District D Cooperative Primary Reading Test	--	23A	--	23B	--	23B
District E Comprehensive Test of Basic Skills	C	S	--	--	1	S
District F Cooperative Primary Reading Test	--	23A	--	23A	--	23B
District G Comprehensive Test of Basic Skills	C	S	--	--	1	S
District H Metropolitan Achievement Test	Pri.I	H	Pri.I	H	Elem.	H
District I Comprehensive Test of Basic Skills	C	S	--	--	1	S
District J Comprehensive Test of Basic Skills	C	S	--	--	1	S
District K Comprehensive Test of Basic Skills	G	S	1	S	1	S

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* Out-of-level testing.

III METHOD OF APPROACH AND ANALYSIS

Several analyses were carried out to study in detail the instructional processes being used in our sample of classrooms. First, we compared schools categorized as "increasers" with those categorized as "decreasers." Next, we looked at the correlations of process variables and reading scores. Finding that classrooms differed significantly in their pretest scores and gain scores, we compared subgroups within the sample using a discriminant function analysis. Finally, we looked at correlations of absence rate and instructional process variables (see Appendix C for process variables).

Comparison of Increaser and Decreaser Schools

A finding in the 1975-76 Evaluation of ECE, ESEA, Title I, and EDY (California State Department of Education, Office of Program Evaluation and Research) indicated that in schools whose students scored at or below the twentieth percentile on the Entry Level Test in 1973-74, third grade reading test scores had declined, relative to their predicted scores over the three-year period from 1973-74 to 1975-76. Although the aggregate finding for that group of schools indicated a decline in scores relative to prediction, individual schools could be identified which had patterns of scores that increased over the period in question, as well as schools in which scores declined. A question of interest became, "What circumstances are associated with decline or improvement in third-grade student reading achievement?"

Process Variable Differences

To study this question, we first compared the 20 classrooms within the schools identified as "increaser" schools and the 25 classrooms in the schools identified as "decreaser" schools. One-way analyses of variance were computed to compare the frequency of process variables used within one set of classrooms with the frequency of those processes used within the other set of classrooms. Statistical differences were found at the $p < .10$ level in 76 out of 390 variables (see Table 7).

The "increaser" schools had longer school days and the classrooms were a little more structured: the classrooms had more stationary desks in rows and assigned seating for students (Var. 19, 20); they less often used toys, audiovisual materials, cooking and sewing equipment, or dramatic play (Var. 26, 38, 39, 44, 51, 234).

Table 7

ANALYSIS OF VARIANCE FOR SEVEN "INCREASER" AND SEVEN "DECREASER" SCHOOLS

Variable Number	Description	Increasers Group I (n = 20)		Decreasers Group II (n = 25)		F	p
		X	S.D.	X	S.D.		
# Absent		11.17	5.18	10.40	2.69		
# Enrolled		29.41	11.57	29.62	2.65		
Pretest		14.27	3.53	11.32	3.65	6.196	.017
Posttest		18.20	3.25	14.48	3.87	10.148	.003
17	Total class duration	5.44	0.36	5.07	0.58	6.343	.015
19	Stationary desks in rows	0.55	0.51	0.29	0.46	3.086	.083
20	Assigned seating for at least part of the day	1.00	0.00	0.50	0.51	19.091	.000
24	Child selection of seating	0.45	0.60	0.92	0.93	3.726	.057
26	Games, toys, play equipment used	1.25	0.64	1.96	1.52	3.787	.056
38	Audiovisual equipment used	0.85	0.81	1.75	1.07	9.504	.004
39	General equipment, materials present	8.35	0.88	9.21	2.21	2.668	.106
40	General equipment, materials used	4.45	2.48	2.46	1.86	9.230	.004
44	Total number different resource categories coded "present" over three days	16.75	2.31	18.75	4.79	2.908	.092
50	Cooking and sewing supplies present	0.05	0.22	0.29	0.46	4.529	.037
51	Cooking and sewing supplies used	0.05	0.22	0.25	0.44	3.363	.070
66	Numbers, math, arithmetic	14.32	7.25	15.48	7.64	0.261	.618
67	Reading, alphabet, language development	31.86	26.88	32.49	12.87	0.010	.88
70	Drill and practice	0.11	0.47	1.76	3.81	3.709	.058
73	Active play/music and dance	4.47	5.11	1.52	2.12	6.633	.013
79	Transitional activities	6.06	5.32	8.29	3.61	2.712	.103
85	Teacher without children	10.86	10.84	3.39	5.18	8.980	.005
90	Overall teacher occurrences	27.45	7.92	35.46	13.05	5.754	.020
91	Aide without children	14.16	14.24	7.25	10.46	3.432	.068
95	Aide with large group	6.93	11.95	25.47	23.34	10.334	.003
96	Overall aide occurrences	13.30	9.07	19.50	13.03	3.220	.076
100	Volunteer with small group	2.39	6.10	11.56	23.61	2.853	.095
103	Adult without children	16.24	11.11	7.28	7.09	10.495	.002
107	Adult with large group	33.74	16.79	42.95	19.14	2.819	.097
108	Overall occurrences of adults	45.80	15.46	58.75	19.21	5.899	.019
117	Large group of children independent	22.00	13.13	15.23	10.39	3.647	.060
125	Two children with aide--math	0.00	0.00	0.97	2.06	4.466	.038
133	Two children with any adults--	0.43	1.08	1.50	2.39	3.367	.070

Table 7 (continued)

Variable Number	Description	Increasers Group I X	Increasers Group I S.D.	Decreasers Group II X	Decreasers Group II S.D.	F	p
139	Large group of children	26.94	29.20	13.87	19.31	3.16	.079
140	Approximate number of children involved in math for all days observed	98.24	55.89	136.46	73.60	3.638	.060
143	One child with teacher--reading	0.08	2.40	1.57	1.80	5.525	.022
155	One child with any adults--reading	1.05	2.87	2.51	2.78	2.918	.091
159	One child independent--reading	-0.17	7.15	2.88	2.72	3.730	.057
160	Two children independent--	0.02	9.77	4.58	5.24	3.887	.053
169	Large group with teacher--social studies	33.82	44.51	14.20	33.56	2.776	.099
185	Large group of children independent--social studies	5.25	14.09	0.38	1.87	2.816	.097
194	Large group with aide--science	0.00	0.00	5.24	14.44	2.623	.109
206	Large group of children independent--science	11.25	30.86	0.00	0.00	3.21	.077
215	Large group of children with aide--arts and crafts	0.00	0.00	3.54	8.62	3.355	.071
225	Two children independent--arts and crafts	1.69	6.44	11.63	24.05	3.213	.077
227	Large group of children independent--arts and crafts	24.78	40.05	3.75	11.06	6.089	.017
252	Sewing, cooking, pounding--longitudinal	0.00	0.01	0.03	0.04	5.841	.019
254	Dramatic play, dress-up--	0.01	0.02	0.00	0.00	3.204	.077
262	Average number of adults in the classroom--longitudinal	1.19	0.32	1.38	0.37	3.094	.082
271	Teacher observing	17.65	14.77	4.93	6.40	14.572	.001
274	Aide participating	0.99	3.38	6.83	7.77	9.726	.003
276	Aide not involved	1.21	2.97	6.39	8.87	6.20	.016
287	Number of FMO's with sewing, cooking or pounding as beginning activity	0.05	0.22	0.58	1.32	3.196	.078
292	Number of FMO's with social interaction as beginning activity	2.15	2.23	0.79	1.64	5.401	.024
296	Number of FMO's with transitional activities as beginning activity	2.00	2.10	2.92	1.41	2.965	.089
355	Adult open-ended questions to children, nonacademic	0.08	0.13	0.00	0.01	8.539	.006
358	All child responses	9.07	1.98	10.09	2.09	2.701	.104

Table 7 (concluded)

Variable Number	Description	Increasers Group I		Decreasers Group II			
		X	S.D.	X	S.D.	F	p
368	Child responses to adult open-ended questions	0.08	0.11	0.02	0.05	5.260	.026
371	Child extended response to adult open-ended question	0.03	0.07	0.00	0.01	3.149	.080
387	Child general comments to adults	0.57	0.51	0.19	0.24	10.283	.003
389	Adult general comments to children	1.06	0.91	0.51	0.53	6.164	.016
393	Child corrective feedback	0.00	0.01	0.01	0.02	3.845	.054
394	All adult acknowledgment to children	2.80	1.22	2.02	1.30	4.127	.046
397	Adult acknowledgment, other task-related	0.84	0.47	0.49	0.31	9.032	.004
405	All adult corrective feedback to children	2.58	1.47	3.88	1.82	6.546	.014
406	Adult positive corrective feedback, academic	1.01	0.69	2.13	1.41	10.406	.003
417	Children attentive to adults, academic	0.00	0.00	0.02	0.05	5.720	.020
418	Adults attentive to children, nonacademic	2.42	1.77	1.07	1.02	9.945	.003
424	Positive behavior, children to adults	0.11	0.24	0.32	0.51	2.953	.089
425	Child expressions of unhappiness	0.44	0.34	1.15	1.06	8.464	.006
426	Adult expressions of unhappiness	1.82	1.08	5.92	5.93	9.278	.004
430	Total adult effect	3.44	1.60	7.21	5.74	8.052	.007
431	Total child effect	1.01	0.59	1.64	1.16	4.896	.031
441	Adult communication or attention focus, large group	4.04	3.66	1.53	2.19	7.857	.007
442	All children nonverbal	1.88	0.60	2.64	1.15	7.060	.011
452	Adult open-ended questions to children (Var. 355a + 356a and/or Var. 486a + 487a)	0.10	0.13	0.04	0.09	4.100	.047
457	All adult positive corrective feedback (Add vars. 406a, 408a, 410a and/or 537c, 539c, 541c)	1.19	0.88	2.33	1.46	9.516	.004
460	All children positive affect (Var. 422a + 424a and/or Var. 553c + 555c)	0.11	0.24	0.32	0.51	2.953	.089
464	Child attentive (Add Vars. 416a, 417a, 446a and/or Vars. 547c, 548c, 577c)	0.00	0.01	0.03	0.07	3.276	.074
471	Adults attentive to large group (Subtract sum of Vars. 420a and 421 from sum of Vars. 418a and 419a and/or subtract sum of Vars. 551c and 552c from sum of Vars. 549c and 550c)	1.39	1.37	0.55	0.75	6.626	.013

Math and reading occurred with about the same frequency in both groups (Vars. 66, 67). Within those academic activities, the "increaser" schools had teachers who less frequently worked with only one or two students at a time in math or reading (Vars. 125, 133, 143, 155). Adults in classrooms of "increaser" schools also less frequently worked with large groups of children and more often worked with small groups (Vars. 108, 194, 215, 267, 168).

In the "increaser" schools, teachers were more often observed to be not involved with children, grading papers and the like (Vars. 85, 91, 103), and children were observed to be working independently in reading, math, science, social studies, and art (Var. 139, 155, 159, 160, 189, 106, 227). Teachers in "increaser" schools more often were observed in social conversations (Vars. 196, 355, 387, 389, 417) and less often in instructional activities (Var. 296).

More open-ended questions were asked in the "increaser" schools. The children were responsive and more often gave elaborated or extended responses (Vars. 355, 368, 371, 452).

The adults in classrooms of "increaser" schools provided more acknowledgment to children but less corrective feedback (Vars. 294, 397, 405, 406, 457).

The children in classrooms of "increaser" schools were a little less attentive (Var. 464). They displayed less unhappiness, less positive affect (Var. 406), and less affect in general (Var. 431).

The findings from the comparison of "increaser" and "decreaser" schools are mixed. The variables found to be associated with success in reading in other studies do not discriminate between the "increaser" and "decreaser" schools. The consistent pattern of the direct teaching techniques is not found in either of these two groups of schools.

Two problems with this analysis should be mentioned. First, in spite of great effort to select a matched sample of schools, some demographic differences in the two groups have been identified (see Table 8). "Increaser" schools have a higher percent of low-income children and more families receiving Aid to Families with Dependent Children. "Decreaser" schools have more bilingual and limited- and non-English-speaking children, a higher mobility rate, and lower first-grade entering school scores. We found it impossible to eliminate the effect of these differences with a sample so small when the direction of differences was inconsistent across the various SES measures.

Second, large and significant variance in the classroom performance of teachers and students can be expected within each school, as well as differences between the schools, in the "increaser" and "decreaser" samples. That is, assignment to the "increaser" and "decreaser" groups on the basis of school level information ignores the variance of classroom process and student achievement within schools. This is evidenced in the fact that standard deviations were sometimes greater than means for several variables.

Table 8

"INCREASER" AND "DECREASER" SUBSAMPLE VALUES ON SCHOOL-LEVEL VARIABLES

	Decreaser Schools				Increaser Schools			
Variable	$\bar{X}$	S.D.	Range	Median	$\bar{X}$	S.D.	Range	Median
School size	731.3	256.6	345-1107	700.0	625.3	147.3	359-755	672.0
Percent low income	34.9	18.8	17-63	25.0	43.0	16.8	18-68	44.0
Percent limited- and non-English-speaking	20.3	18.2	0-47	25.0	10.1	10.6	0-29	6.0
Percent educationally disadvantage students	72.6	17.4	47-87	80.0	70.3	21.0	39-92	79.0
Mean Entry-Level Test Score*	22.26	2.43	19.01-24.61	23.69	24.60	2.28	20.38-27.33	24.97
Socioeconomic status index	1.56	0.24	1.35-1.95	1.42	1.71	0.41	1.14-2.41	1.61
Percent with Aid for Families with Dependent Children	28.9	16.0	13.5-47.9	18.0	36.7	21.2	17.6-75.4	25.7
Percent bilingual*	45.3	32.1	2.5-94.6	57.8	33.5	22.3	4.9-64.3	34.6
Mobility index*	39.1	5.6	29.2-45.9	40.0	35.4	10.6	18.5-52.6	34.3
Number of primary languages other than English	4.0	2.7	1-9	4.0	3.7	3.2	1-9	3.0
Number of years tenure of principal	-	-	1-10+	4.0	-	-	2-10+	4.0

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*Index developed by California Assessment Program, State Department of Education. For description, see _Interpretive Supplement to the Report on the Reading Test, Second and Third Grades_, 1977, California Assessment Program, Sacramento, CA, State Department of Education, 1977.

The current observation study of ECE focuses on classroom environments, processes, and interactions. Data were collected in classrooms and the unit of analysis is the individual classroom. Since student achievement measured by the CAP reading test is the dependent variable for much of the analysis, mean scores by classroom were used in this study. We found considerable variation in the instructional processes used within the "increaser" and "decreaser" subgroups of schools. We were also interested in seeing whether there were differences in the pretest, posttest, and gain scores between these two groups and if there were differences in these variables within the schools themselves.

Test Score Differences

These classroom means and gain scores for each class are portrayed in Tables 9 and 10. Scores for schools labeled "increaser" schools by the OPER are presented in Table 9 and those for "decreaser" schools are shown in Table 10.

Before examining the results in detail, we raised the following questions to structure the investigation:

(1) Do classrooms within individual schools differ significantly from each other and from the school mean, or are these measures approximately the same?

(2) Considering the school and classroom status and gain scores, how do the students in these schools compare with other California third grade reading students?

The first question concerns intraschool variability and, implicitly, the appropriateness of using average school statistics to describe heterogeneous classroom populations. Using the data in Table 9 we compared the school means for Spring 1977 with the individual class means to determine if significant differences exist. The fourth column in Table 9 presents the posttest reading scores (Spring 1977) for all third graders in each sample classroom as well as the overall mean for all third graders at each school.

It can be seen that in seven of the fourteen schools there are significant differences between class and school means. A significant difference is defined arbitrarily here as approximately 10 percentage points, the size of the standard deviation for the sample of schools in California. Thus, in one-half of the schools in the sample, there are differences of at least one standard deviation between achievement levels of students in different classes. Consider the following examples:

Table 9

PRE, POST, AND GAIN READING SCORES OF CLASSROOMS IN "INCREASER" SCHOOLS

Increaser Schools	Grade	% Pre Score	% Post Score	% Gain Score	Matched Number of Students	Sub Group
School 101		61.6	71.9	10.3		
Teacher 01	3	61.9	80.6	18.7	21	5
Teacher 02	3	57.6	81.4	23.8	17	5
School 201		54.0	74.9	20.9		
Teacher 01	2-3	79.0	89.0	10.0	4	7
Teacher 02	2-3	58.0	77.0	19.0	8	5
Teacher 03	2-3	43.3	63.6	20.4	11	3
School 401		43.9	59.9	16.0		
Teacher 01	3	52.2	68.0	13.8	18	4
Teacher 02	3	36.0	52.9	16.9	9	2
Teacher 03	3	44.0	55.8	11.8	16	3
Teacher 04	3	36.0	48.6	12.6	13	2
School 603		54.4	70.9	16.5		
Teacher 01	3	53.8	71.1	17.2	13	4
Teacher 02	3	54.6	73.7	19.2	14	4
Teacher 03	3	56.0	75.8	19.8	18	4
School 801		47.6	65.0	17.4		
Teacher 01	3	50.8	67.4	16.6	14	4
Teacher 02	3	41.7	63.3	21.7	12	3
Teacher 03	3	50.1	74.1	24.0	17	4
School 901		63.3	64.3	1.0		
Teacher 01	3	63.0	65.7	2.7	12	6
Teacher 02	3	65.0	70.5	5.5	16	6
School 1001		75.4	90.4	15.0		
Teacher 01	1-3	73.2	88.6	15.4	7	7
Teacher 02	1-3	81.2	92.0	10.8	7	7
Teacher 03	1-3	84.0	97.3	13.3	6	7
State Average		67.7	81.7	14.0		

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n = 20 classrooms with pre- and posttest scores.

Table 10

PRE, POST, AND GAIN READING SCORES OF CLASSROOMS IN "DECREASER" SCHOOLS

Decreaser Schools	Grade	% Pre Score	% Post Score	% Gain Score	Number of Students	Sub Group
School 301		55.7	65.4	9.7		
Teacher 01	3	63.7	83.4	19.7	13	5
Teacher 02	3	56.0	57.7	1.7	14	6
Teacher 03	3	47.2	72.0	24.8	5	4
School 302		59.8	73.6	13.8		
Teacher 01	3-4	56.4	79.1	22.7	9	4
Teacher 02	3	59.5	74.4	14.9	15	5
Teacher 03	2-3	58.3	80.0	21.7	7	5
School 501		39.8	46.7	6.9		
Teacher 01	3	70.7	70.7	0	3	6
Teacher 02	3	—	—	—	-	
Teacher 03	3	—	—	—	-	
Teacher 04	3	16.6	34.8	18.3	7	1
Teacher 05	3	32.7	32.7	0	6	1
Teacher 06	3	—	—	—	-	
School 601		41.1	60.6	19.5		
Teacher 01	3	41.6	59.7	18.1	15	3
Teacher 02	3	34.8	57.4	22.6	14	2
Teacher 03	3	43.6	62.0	18.4	10	3
School 602		51.6	66.3	14.7		
Teacher 01	3	—	—	—	-	
Teacher 02	3	—	—	—	-	
Teacher 03	3	—	—	—	-	
Teacher 04	3	—	—	—	-	
School 701		46.3	57.7	11.4		
Teacher 01	K-3	28.0	36.0	8.0	2	1
Teacher 02	K-3	30.7	44.0	13.3	3	2
Teacher 03	K-3	54.7	57.3	2.7	3	6
Teacher 04	K-3	35.0	43.0	8.0	4	2
School 1101		51.6	66.9	15.3		
Teacher 01	2-3	41.2	61.7	20.6	7	3
Teacher 02	2-3	57.8	58.7	.9	9	6
State Average		67.7	81.7	14.0		

School X		School Y	
Teacher 01	84.0%	Teacher 01	59.7%
Teacher 02	77.0	Teacher 02	57.4
Teacher 03	63.6	Teacher 03	62.0
Total School	74.9%	Total School	60.6%

The interclassroom variability in these two schools is clearly not equal; significant differences between classroom scores can be found in School X but not in School Y. Correspondingly, the value and meaning of the school-wide "average score" is different at the two schools. In School Y this statistic is comparatively representative of achievement in individual classrooms, but at School X it is more misleading than useful because it glosses over important differences between classrooms and accurately describes only one of the three classrooms in the school. The classroom is the level at which instruction takes place and at which teaching strategies, techniques, and environments impact upon the student. To aggregate up from classrooms to schools, especially in situations similar to that of School X, means that these classroom effects and levels of achievement are cancelled out.

The second question we want to address is how classrooms in our sample, selected on the basis of their low ELT scores, compare with other California third grades. The mean score for California third graders in Spring 1977 was 81.7% correct; when those students were second graders a year earlier in Spring 1976, the mean score was 67.7% correct. Thus, the "average" California third grader had to gain 14 percentage points to maintain the same position in the score distribution for that cohort group. How do student gains in our sample compare? These data were presented in the fifth column in Table 10.

The results here are striking. Of the 32 classrooms for which we have pre- and posttest matched scores for 5 or more students,* 21 classrooms gained more than the state average of 14 percentage points. Eight of these classrooms were in schools classified as "decreaser" schools. Again, the contrast between school and class scores is illuminating: in several schools significant differences exist between the school gain and individual class gains. A dramatic example is presented below:

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* School 701 has grades K-3 in one classroom. Only 3 or 4 third-grade students have pre- and posttest scores. These classrooms and one in school 501 were not used in the analysis.

School X	
Teacher 01	19.7%
Teacher 02	1.7
Teacher 03	24.8
Total School	9.7%

We should note first that not all third-grade teachers at every sample school participated in the study; the absence of one or two classrooms helps explain why the school means on Tables 9 and 10 cannot be computed from the scores of the classrooms presented. A second caveat is that our classroom means are based upon a matched sample of children, whereas the school means represent entire cohorts of children that change from year to year. Thus, our classroom means are based on a subsample of children that may or may not be representative of the students at that school. The importance of this possibility is mitigated, however, by the following two considerations:

- None of the sample schools reported substantial demographic changes (such as a desegregation order) that would have affected their CAP scores between Spring 1976 and Spring 1977. This would suggest that students who left the classroom were replaced by students who were of similar background and achievement status.
- Examination of the characteristics of students in the matched sample of students indicated that they did not differ systematically from the overall school population on either the state socioeconomic status index or percent bilingual index.

These considerations do not then change the conclusion that significant differences exist between the rates of gain registered by classes within schools, and that the students in 21 classrooms identified as low-achieving gained more than the average California student during the third-grade year.

Instructional Processes Related to Reading Achievement

To study the instructional processes related to reading, we initially planned only to perform partial correlation and stepwise regression analyses for the ECE sample as in the Follow Through Observation Evaluation 1972-73 (Stallings and Kaskowitz, 1974).* However, the data collected for the ECE study indicated that pretest scores varied widely among classrooms;

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* See Appendix C for a comparison of ECE and Follow Through observation data.

classroom averages in Spring 1976 ranged from an average 30.7% correct to 84% correct. With such variations in the groups of students teachers received in the Fall of 1976, teachers could be expected to use different instructional processes to teach them. Instructing a class of students who entered third grade with very low reading ability is likely to require different teaching techniques than instructing students who enter third grade with average or above-average ability. Partial correlations or stepwise regressions using the total sample of 38 classrooms was likely to mask interesting process/outcome relationships in subgroups of classrooms.

Therefore, we developed an analysis plan that included the following steps:

(1) Two-tailed Pearson product moment correlations between classroom process variables and Spring 1977 reading test scores.

(2) Partial correlations between classroom process variables and reading achievement, holding Spring 1976 scores constant.

(3) Stepwise regression of Spring 1977 reading scores, entering Spring 1976 reading scores first, then classroom process variables.

(4) Scatterplot of classes based on pre- versus posttest scores to determine achievement subgroups within the total sample.

(5) Discriminant analysis to verify the utility of the achievement subgroups on the basis of differences in classroom processes.

(6) One-way analyses of variance and orthogonal contrasts on selected input variables to further examine intergroup differences.

(7) Summary group descriptions.

Correlations and Regressions Using Instructional Process Variables and Reading Scores

Pearson Product Moment Correlations and Partial Correlations

Our first step in examining the relationships between classroom processes in ECE classrooms was to compute two-tailed Pearson product moment correlations between the posttest and the process variables, and partial correlations holding Spring 1976 reading test scores constant. While partial correlations are the most important correlation to consider when searching for relationships between student growth and instructional process, Pearson correlations relate a wider set of variables which describe how instructional processes are related to student outcome regardless of the

Table 11

PARTIAL CORRELATIONS* AND TWO-TAILED PEARSON PRODUCT MOMENT CORRELATIONS BETWEEN READING SCORES AND CLASSROOM PROCESSES

(n = 38)

Variable Number	Description	Pearson Correlations		Partials Correlations	
		r	p	r	p
15	Ratio of students high to T+A	-.39	.01	-.43	.001
16	Ratio of students high to T+A+V	-.38	.01	-.38	.01
18	Movable tables and chairs	.38	.01	.11	.50
22	Teacher assigns students to groups	.45	.001	.46	.001
24	Children select work groups	-.32	.05	-.24	.15
25	Games, play equipment present	.30	.05	-.43	.001
28	Instructional materials used	.32	.05	.25	.15
36	Instructional charts used	.29	.05	.10	.50
40	General equipment used	.36	.05	.38	.01
45	All resource material categories used	.36	.05	.34	.05
49	Achievement charts used	.44	.01	.27	.10
54	Sandbox, water equipment	-.32	.05	-.19	.25
62	Group sharing-time	-.55	.001	-.42	.001
67	Average occurrence of reading per child	.30	.05	.31	.05
79	Transition activities	-.29	.05	-.13	.40
81	Teacher out of the room	-.39	.01	-.36	.05
88	Teacher with small group	.34	.05	.32	.05
89	Teacher with large group	-.31	.05	.15	.30
112	Large group with any adult	-.40	.01	.03	--
143	One child with teacher--reading	-.36	.05	-.38	.01
155	One child with any adult reading	-.34	.05	-.37	.05
242	Percent activities on academic subjects	.56	.001	.41	.01

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* Holding Spring 1976 test scores constant

student's entry test scores. We thought it would be of interest to examine both sets of correlations.

Since we used the same observation system that was used in the Follow Through observation study, we used selected process variables constructed for that study in our ECE analysis. A total of 253 activity and interaction variables were used. Out of those, 49 Pearson product moment correlations were significantly correlated with outcome achievement scores at $p < .05$. The 49 variables identified in the Pearson product moment analysis were then used in the partial correlation analysis. Of these, 31 variables were significantly correlated ($p < .05$) with achievement (see Table 11). Because of the chance of collinearity of variables, these correlations must of course be interpreted with caution; however, if these findings are similar to the findings of other studies, they become more believable.

Organization of Groups--In the ECE classrooms, the lower the ratio of students to adults, the higher are the achievement test scores (Vars. 15, 16; see Table 11). The correlation is even higher for the partial correlations ($r = -.43$).* The ECE aides apparently are functioning well as teaching assistants.

How teachers organize their classrooms, use the aides, and group children has a relationship to reading achievement. These data suggest that teachers should assign students to working groups and should not allow them to select their own groups or places to sit during working time (Var. 22).

Small Groups--The most efficient way in ECE to distribute the adults' time seems to be working with small groups (Vars. 88, 376, 420, 440). Approximately 29% of the reading time over all classrooms was a allocated to teaching small groups. In classrooms where more time was spent with small groups, the scores were higher.

Individual Child--In classrooms where teachers, aides, or volunteers more often worked with one child at a time, the posttest scores were lower (Var. 143, 155). This does not imply that teachers or aides should not work with one child at a time or that individual tutoring is not beneficial. It does imply that within the normally functioning classroom it is not efficient for the instructors to allocate very much of the reading time to working with only one student at a time. While the mean for ECE adults working with one child is low (approximately 2% of their reading

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* The Follow Through findings were just the opposite; the more adults in the classroom and the lower the ratio of students, the lower were the test scores. However, when the ratio of students to adults is as high as 18:1 as it was in the Follow Through study sample, the effect of the parttime aide may not be sufficient to raise test scores.

Table 11 (Concluded)

Variable Number	Description	Pearson Correlations		Partials Correlations	
		r	p	r	p
244	Percent of group time-sharing over total day	-.55	.001	-.42	.001
249	Percent of reading occurring over total day	.31	.05	.32	.05
271	Teacher observing the group	.33	.05	.22	--
272	Teacher not involved with children	-.37	.01	-.40	.001
293	Number of social interactions that begin observation	-.48	.01	-.43	.001
342	Adult to child--verbal	.41	.01	.32	.05
343	Child initiates verbal interaction	.41	.01	.41	.01
350	Child asks questions	.36	.01	.33	.05
352	Adult asks nonacademic questions	-.40	.01	-.41	.01
354	Adult asks academic questions of individual child	.32	.05	.30	.05
359	Child response to nonacademic question	-.36	.05	-.40	.01
362	Child response to academic question	.35	.05	.30	.05
367	Adult response to child question with direction question	.39	.01	.23	--
374	Adult instruction--academic	.34	.05	.30	.05
376	Adult instructs a small group	.32	.05	.30	.05
386	Child task related comments	.27	.05	-.04	--
394	All adult acknowledgment to students	.37	.05	.46	.001
395	Adult acknowledgment for academic	.35	.05	.49	.001
412	Feedback, to response, to academic question	.34	.05	.42	.001
420	Adult works with small group	.41	.01	.29	.05
429	Child negative behavior	-.32	.05	-.25	--
435	Total academic interactions	.35	.05	.43	.007
440	Adult communication to small groups	.43	.001	.41	.01
451	All adult direct academic questions	.33	.05	.29	.05
453	All adult responses to child question with a question	.39	.01	.23	--
455	All adult instruction	.35	.05	.25	--
461	All child negative affect	-.33	.05	-.24	--

time), teachers in some classrooms were spending 6-8% of their time with individuals. What is likely to happen when the adults spend more time with individuals is that other children will not have the necessary direction or supervision to stay on their reading tasks.

Large Group--There was a negative relationship found between reading posttest scores and teachers teaching large groups in the Pearson correlations (Var. 89) but not the partial correlations. This suggests that when the effect of initial scores is eliminated, large instruction is neither positive nor negative in its relationship to achievement. ECE teachers are, on the average, allocating approximately 27% of the reading time to instructing the large group. Large groups were defined as eight or more children up to the total group minus 1.

Teacher Time Without Children--Some of the time (26%), teachers were not involved with the children. They graded papers, prepared lessons, or talked with other adults, prepared art materials, or were out of the room. Where this happened more often, the scores in those classrooms were lower (Vars. 81, 272, 293).

Activities Occurring--The more group sharing-time that occurred, the lower the posttest scores (Var. 62). This does not imply that there should not be any group sharing-time. The average amount of time spent in group sharing was approximately 20 minutes a day (6% of 5.5 hours) but some classrooms spent twice that much time while others spent much less. The caution here is not to spend so much time in group sharing or discussions that too little time is spent in reading. The more reading that occurred, or the more time spent on that task, the higher the test scores. This is indicated by variables that describe the amount of time students spend reading or doing reading-related activities (Vars. 67, 242, 249, 435).

Materials Present and Used--Several materials or resources had a positive relationship with the posttest scores. Significant Pearson correlations include instructional charts, achievement charts, and games (Vars. 25, 28, 36, 49). When the effect of pretest scores is removed, the games variable has a negative relationship to gain (Var. 25). This suggests that in classrooms with more able students games have a positive effect on scores, while in classrooms with less able students such games have a negative effect. Only general equipment and instructional materials are significantly related to gain in the partial correlations. Audiovisual equipment or television did not show a significant positive or negative relationship with the test scores in either set of correlations.

Interactions--A very directive method of instruction has a positive correlation with the posttest score. In this method, the teacher provides instruction, asks children direct questions about the subject, the children respond, and the teacher provides feedback, letting the child know whether the response was acceptable. Variables 354, 362, 374, 395, and 412 describe this kind of interaction. Acknowledgment and corrective feedback for children's responses to academic questions have especially high correlation with reading achievement (.49 and .42).

Children Questioning--When children in classrooms showed more verbal initiative by asking questions, the classroom scores were higher (Vars. 343, 350). When children asked academic questions, if the adults responded with a direct question rather than telling them the answer, the reading scores were higher (Var. 367) on the Pearson correlations.

Distraction--Off-task behavior had a negative effect on the posttest scores. When adults and children were more often involved in non-academic interactions (Vars. 352, 359, 293), the reading test scores were lower. Also, the Pearson correlations suggest that in classrooms where children exhibited negative or disruptive behavior, the test scores were lower (Vars. 429, 461).

Stepwise Regressions

Since so many variables were significantly correlated with reading scores, stepwise regressions were computed to determine which variables accounted for the most variance in predicting reading achievement scores.

The pretest score accounts for 79% of the posttest score variance. Three process variables explain another 10% of the variance. Two of the variables suggest a structured situation where the teacher assigns students to groups and the verbal interactions are academically oriented. The variable "Teacher working with one child in reading" has a negative relationship. Where that occurs with greater frequency, it is related to lower test scores and explains a small portion of the variance (see Table 12).

Table 12

STEPWISE REGRESSION OF POSTTEST READING SCORES
HOLDING PRETEST SCORES CONSTANT

Variable Number	Description	R^2	R^2 Change	b
	Pretest	.79	.79	.79
22	Teacher assigns students to group	.85	.06	.13
435	Total academic interactions	.87	.02	.16
143	One child with teacher in reading	.89	.02	-.14

Since the pretest accounted for so much of the posttest score, we wanted to see what variables were related to the posttest score if the pretest were not entered in the equation. By rerunning the stepwise regressions without the pretest, we were trying to determine (1) the change in the predictive power (R^2) of the new equation and (2) those variables related to posttest via the pretest (i.e., the pretest as a moderator variable; see Table 13).

Without the pretest, the process variables explain 62% of the variance. The variable that describes the percent of time children are observed to be involved in the academic activities of reading or math explains 31% of the test score variance when the pretest is excluded from the analysis.

Interactions that are social in content explain 13% of the test score variance. This variable indicates that the teacher and students are off the task. Where this occurs more frequently, the scores are lower. Movable tables and chairs allow for small group arrangements. This variable accounts for 9% variance. The teacher observing the group is a variable that indicates the teacher is supervising the children while they work independently.

Summary of Correlations and Regressions Findings

These preceding correlational findings are similar to other findings regarding the direct approach to teaching reading and off-task behavior. These findings are similar to those of Stallings and Kaskowitz (1974), Brophy and Everston (1975), McDonald and Elias (1975), and Rosenshine (1977). Clearly, it is beneficial for teachers to keep children on task, and this seems to be best accomplished in environments where the teacher assigns children to seats and to groups, provides instructional

Table 13

STEPWISE REGRESSIONS OF POSTTEST READING SCORES AND PROCESS VARIABLES

Variable Number	Description	R^2	R^2 Change	b
242	Percent of activities that are academic	.31	.31	.39
293	Number of observations started with social interaction	.44	.13	-.34
18	Movable tables and chairs	.53	.09	.38
271	Teacher observing students as they work	.62	.09	.31

materials, stays working with the children, teaches them in small groups, and uses a question-response-feedback technique for instruction.

Subgroups Determined by Pretest, Posttest, and Gain Scores

To further examine the relationships between classroom processes and achievement, we wanted to see whether we could define instructional processes most relevant to producing test score gains for particular groups of classrooms. We hypothesized that a teacher of a classroom with a posttest/pretest difference of 15% and an initial test level of 40% might differ in approach to teaching from a teacher whose class had an identical gain but started with a pretest level of 70%. Therefore, a scattergram plotting posttest versus pretest was created to attempt a clustering of classes on the basis of pretest level and amount of test score gain (see Figure 4).

The determination of achievement groups required several steps. First, a "no gain" line was defined (posttest - pretest = 0) where there was no difference between posttest and pretest score means. Second, to be consistent with other studies of this type, a "gain" line was set at one standard error above the no-gain line (Berlinen and Ticknoff, 1975). The no-gain group, then, becomes those classrooms with posttest-pretest differences falling between the standard-error gain line and the no-gain line. Third, the classrooms were assigned to seven groups on the basis of pretest levels. The scattergram resulted in the groups of classrooms exhibited in Table 14.

A special note is required on the a priori determination of Groups IV (medium pretest/gain) and V (high-medium pretest/gain). The 14 classrooms involved all exhibited similar gain, but the variance of the pretest scores was substantial. Therefore, in order to obtain the most appropriate comparison group for Group VI (high-medium pretest/no gain), the 14 classrooms were split into two pretest groups: Group V was statistically equivalent to the pretest level for Group VI, while Group IV had a lower average pretest. A comparison of Groups V and VI indicated no statistical differences in the test scores of the two groups at the beginning of the third-grade year:

Group V: $\bar{X}$ raw score = 15.04

Group VI: $\bar{X}$ raw score = 15.30

$t = 5.60$; $p = .12$ (no statistical difference

In addition to the High-medium pretest gain/no gain comparison, we attempted to find an analogous situation at the lower pretest level. Groups I and II, then, were identified and an F test was conducted to examine the difference in pretest score level. Unfortunately, the average pretest level for the two groups was significantly different, so that a gain/no gain comparison controlling for pretest level was not possible:

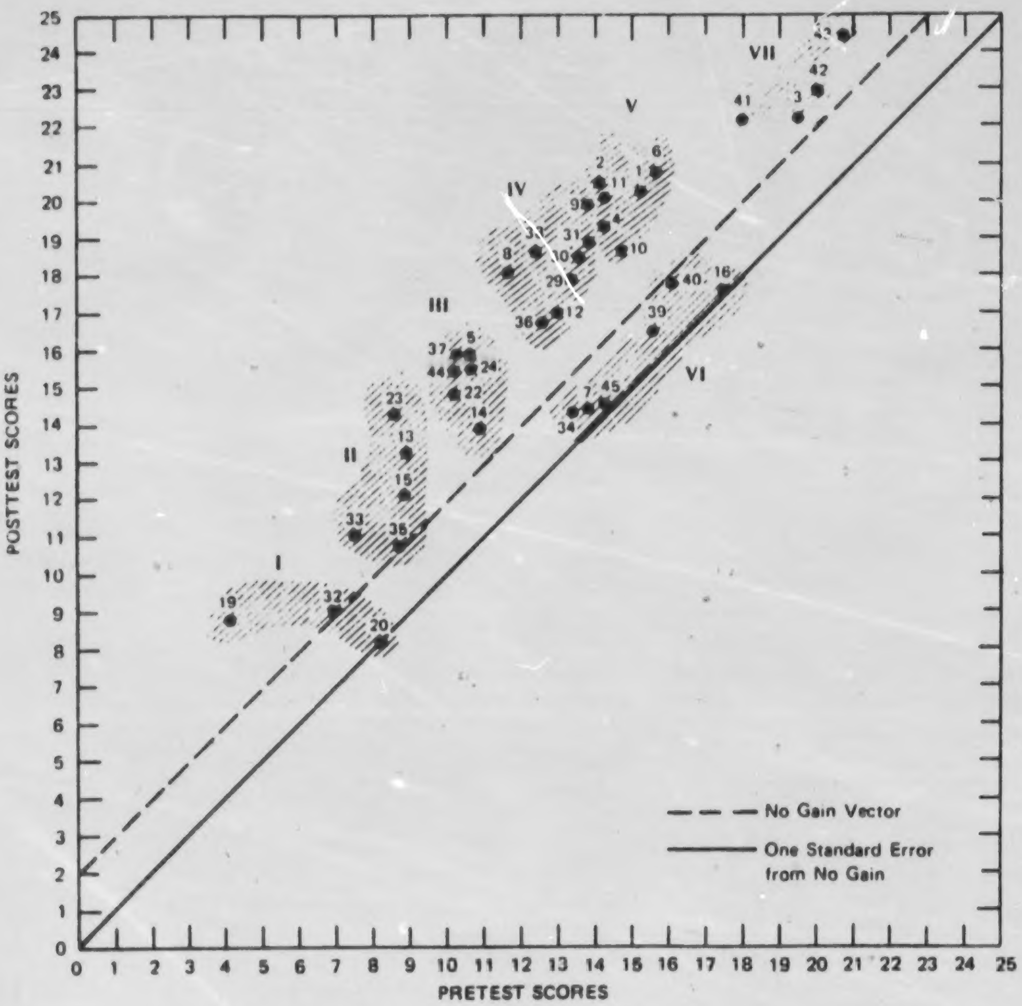

FIGURE 4 SCATTERGRAM OF ECE THIRD GRADE PRETEST AND POSTTEST SCORES

Table 14

NUMBER OF CLASSES IN EACH SUBGROUP

Group		Number of Classes	Pretest Score*	Percent Gain
I	Low pretest/no gain	3	37%	8%
II	Low pretest/gain	5	37%	12%
III	Low-medium pretest/gain	6	41%	15%
IV	Medium pretest/gain	8	47%	16%
V	High-medium pretest/gain	6	57%	14%
VI	High-medium pretest/no gain	6	54%	7%
VII	High pretest/gain	4	73%	10%
	Total	38		

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* Percent of total correct.

Group I: $\overline{X}$ raw score = 6.44

Group II: $\overline{X}$ raw score = 8.63

F = 5.51; p = .06 (significantly different at
the .10 level)

From the seven groups formed, only Groups V and VI were selected for comparison. Groups V and VI both started with scores of approximately 60% correct but only Group V gained. We thought it would be of interest to see how these groups differed on the process variables being used in the classrooms. In order to see whether these two sets of subgroups differed initially, several analyses were conducted.

Discriminant Analysis

In order to ascertain whether the groups defined by achievement and prescore level differed in structure, three discriminant analyses were conducted. The objective was to find out whether a discriminant analysis would confirm the legitimacy of the a priori groups. A stepwise discriminant procedure was selected, using an F-to-enter criterion of approximately .10 level of significance. Based upon prior research findings and the utility of the variables in describing classroom procedures, one hundred variables were selected for the analyses by the principal researcher. The first analysis attempted to differentiate among all seven groups simultaneously. It was hypothesized that such a comparison would be inconclusive given the arbitrary separation of Group IV and V, and the relatively close pretest levels of Groups I, II, and III. The discriminant analysis failed to derive a set of functions that would correctly categorize the seven groups (51.35% of the classes were assigned to the correct a priori group, a low success ratio).

Of more interest, then, was the comparison of the appropriate gain/no gain groups from the scattergram (i.e., high-medium/gain versus high-medium/no gain). Groups V and VI also produced two variables and one discriminant function that was sufficient to classify all the classes into the appropriate a priori groups (Table 15). The gain group had a lower ratio of children to adults (more adults per student) and more teacher acknowledgment in academic tasks.

In conclusion, the second discriminant analyses presented a statistical confirmation of the gain/no gain groups derived from the scattergram, providing the researchers with a measure of confidence in proceeding with analyses to determine within-group composition and intergroup differences. The remaining groups were kept primarily for descriptive purposes.

Table 14

NUMBER OF CLASSES IN EACH SUBGROUP

Group		Number of Classes	Pretest Score*	Percent Gain
I	Low pretest/no gain	3	37%	8%
II	Low pretest/gain	5	37%	12%
III	Low-medium pretest/gain	6	41%	15%
IV	Medium pretest/gain	8	47%	16%
V	High-medium pretest/gain	6	57%	14%
VI	High-medium pretest/no gain	6	54%	7%
VII	High pretest/gain	4	73%	10%
	Total	38		

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* Percent of total correct.

Group I: $\overline{X}$ raw score = 6.44

Group II: $\overline{X}$ raw score = 8.63

F = 5.51; p = .06 (significantly different at
the .10 level)

From the seven groups formed, only Groups V and VI were selected for comparison. Groups V and VI both started with scores of approximately 60% correct but only Group V gained. We thought it would be of interest to see how these groups differed on the process variables being used in the classrooms. In order to see whether these two sets of subgroups differed initially, several analyses were conducted.

Discriminant Analysis

In order to ascertain whether the groups defined by achievement and prescore level differed in structure, three discriminant analyses were conducted. The objective was to find out whether a discriminant analysis would confirm the legitimacy of the a priori groups. A stepwise discriminant procedure was selected, using an F-to-enter criterion of approximately .10 level of significance. Based upon prior research findings and the utility of the variables in describing classroom procedures, one hundred variables were selected for the analyses by the principal researcher. The first analysis attempted to differentiate among all seven groups simultaneously. It was hypothesized that such a comparison would be inconclusive given the arbitrary separation of Group IV and V, and the relatively close pretest levels of Groups I, II, and III. The discriminant analysis failed to derive a set of functions that would correctly categorize the seven groups (51.35% of the classes were assigned to the correct a priori group, a low success ratio).

Of more interest, then, was the comparison of the appropriate gain/no gain groups from the scattergram (i.e., high-medium/gain versus high-medium/no gain). Groups V and VI also produced two variables and one discriminant function that was sufficient to classify all the classes into the appropriate a priori groups (Table 15). The gain group had a lower ratio of children to adults (more adults per student) and more teacher acknowledgment in academic tasks.

In conclusion, the second discriminant analyses presented a statistical confirmation of the gain/no gain groups derived from the scattergram, providing the researchers with a measure of confidence in proceeding with analyses to determine within-group composition and intergroup differences. The remaining groups were kept primarily for descriptive purposes.

Table 15

CLASSIFICATION OF GROUPS V AND VI BY DISCRIMINANT ANALYSIS

Actual Group	Number of Cases	Predicted Group Membership	
		Group V	Group VI
Group V	6	6 100.0%	0 0.0%
Group VI	6	0 0.0%	6 100.0%

Note: Percent of "grouped" cases correctly classified = 100%.

Analysis of Variance

In order to examine intergroup differences, two sets of one-way analyses of variance, using the same variables selected for the discriminant analyses, were conducted. That is, all seven groups were compared in addition to Group V versus Group VI. See Table 16 for descriptive statistics of the seven groups.

Medium-High Pretest Scores

Twelve classrooms had medium high pretest scores. These pretest scores ranged from 54.7% to 70%. During the third-grade year, six of these classrooms (Group V) made gains of between 14.9% and 23%. Three of these were located in schools identified as "increaser" schools and three were in schools identified as "decreaser" schools. Six other classrooms (Group VI) made gains of only 0.9% to 6.9%. Two of these classrooms were in schools identified as "increaser" schools and four were in schools identified as "decreaser" schools.

Twice as many students were present in the classroom for Group VI, the no-gain group, and the ratio of students to teacher was much lower in Group V, the gain group. The ratio was approximately six children to one adult in the gain classrooms, whereas there were approximately thirteen children to one adult in the no-gain group. The difference in this ratio could account for much of the test score difference, but how the aides and teachers work with the children is of primary importance.

The two groups differed in the instructional processes used in several important ways (see Table 17).

Materials and Activities--The gain group used more instructional materials and equipment, achievement charts, story books, and audiovisual equipment (Vars. 40, 48, 59, 237). They also had a wider variety of activities occurring during the day (Vars. 82, 83).

The no-gain group had more arts and crafts and dramatic play occurring (Vars. 211, 281, 434) while the children in the gain group were more often involved in reading (Var. 163). Even though the ratio of children to adults was higher in the no-gain group (18:1), the adults in the no-gain classrooms more frequently worked with one child at a time (Vars. 104, 124, 132). It follows, then, that other children in the no-gain classrooms worked alone more frequently than did children in the gain group (Vars. 117, 139, 165). This organization does not seem efficient for children, since many may not have the supervision, guidance, or reinforcement they need as they wait for their turn to work with the teacher.

The no-gain classrooms may, in general, provide less supervision. The teacher is more often out of the classroom and is less often directly involved with the children (Vars. 81, 272). This lack of supervision may

Table 16

DESCRIPTIVE STATISTICS OF SEVEN GROUPS

Group	Number of Classes	Mean Number of Students	Ratio		Absence		Pretest Raw Score		Posttest Raw Score		Gain Raw Score	
			$\bar{X}$	S.D.	$\bar{X}$	S.D.	$\bar{X}$	S.D.	$\bar{X}$	S.D.	$\bar{X}$	S.D.
I Low pretest/no gain	3	31.0	13.03	2.00	10.70	3.65	6.44	2.07	8.63	0.42	2.19	2.29
II Low pretest/gain	5	29.6	15.00	5.72	12.58	4.06	8.63	0.55	12.30	1.52	3.67	1.36
III Low-medium pretest/gain	6	28.7	13.82	5.20	13.23	4.84	10.43	0.30	15.26	0.73	4.62	0.89
IV Medium pretest/gain	8	40.3	11.66	2.67	9.54	2.43	13.16	0.79	18.16	0.98	5.00	0.87
V High-medium pretest/gain	6	22.4	5.85	2.30	11.50	3.73	15.04	0.65	19.84	0.90	4.80	0.79
VI High-medium pretest/no gain	6	28.5	13.31	2.83	10.45	2.50	15.30	1.54	15.86	1.58	0.56	0.48
VII High pretest/gain	4	25.5	11.66	1.68	6.25	6.33	19.83	1.15	22.93	1.01	3.10	0.62
State average							16.92		20.42		3.25	

Table 17

PROCESS VARIABLES ON WHICH GROUPS V AND VI DIFFER

Variable Number and Description		Group V (n=6) $\bar{X}$	Group VI (n=6) $\bar{X}$	p
010	Number of children enrolled	22.40	40.33	.05
011	Number of children present	15.90	32.03	.04
015	Child/teacher and aide ratio	6.65	14.33	.01
016	Child/adult ratio (teachers, aides, and volunteers)	5.85	13.31	.001
040	General equipment, materials used	3.80	1.83	.07
048	Achievement charts present	1.00	0.50	.07
059	Children's story books used	0.80	0.17	.04
081	Teacher out of room	0.91	6.95	.04
082	Wide variety of activities, concurrent	1.60	1.09	.03
083	Wide variety of activities over one day	6.80	4.64	.07
104	Adult with one child	8.85	20.12	.08
117	Large group of children independent	10.12	22.23	.06
124	One child with aide--math	0.33	1.21	.04
132	One child with any adults--math	0.78	2.17	.09
139	Large group of children independent--math	17.31	48.33	.04
163	Approximate number of times children were recorded in reading over one day	100.00	85.00	.10
165	All children independent--reading	35.52	62.05	.06
211	Large group of children with teacher--arts and crafts	0.00	42.70	.08
237	Audiovisual equipment, academic activities	8.02	1.04	.08
272	Teacher not involved with children	0.00	6.52	.08
281	Number of FMOs with arts and crafts as beginning activity	0.20	1.17	.07
355	Adult open-ended questions to children, nonacademic	0.08	0.01	.04
368	Child responds to adult open-ended question	0.11		.01
369	Child extended response, nonacademic	0.17	0.07	.05
373	Adult instructs all children	1.39	0.43	.09
376	Adult instructs a group	3.68	1.41	.05
394	All adult acknowledgment to children	3.23	1.69	.02
395	Adult acknowledgment to children, academic	2.23	1.13	.04
397	Adult acknowledgment to children other than task-related	0.97	0.51	.09
404	Adult praise, other than task-related	0.26	0.08	.05
412	Adult feedback for child response to adult academic command, request, or direct question	1.55	0.68	.05
428	Negative behavior, adults to children	0.05	0.15	.09
434	Dramatic play, pretending	1.61	3.21	.02
452	All adult open-ended questions to children	0.18	0.02	.02
454	Child's extended response	0.64	0.22	.03
463	All negative behavior	0.05	0.15	.05

be reflected in the fact that more negative behavior was exhibited in no-gain classrooms (Vars. 428, 434, 463).

Interactions--In the gain group, the adults more frequently provide instruction and more often in a small group (Vars. 373, 376). They asked more direct academic questions; the children responded to these questions and received feedback from adults (Var. 412). Much of the feedback was in the form of acknowledgment during these academic interactions (Var. 395).

The teachers in gain classrooms also ask more open-ended questions, both academic and nonacademic (Vars. 355, 452). The children responded to these questions and more often with extended replies (Vars. 368, 369). Overall, the teachers in gain classrooms provided more acknowledgment and praise to children (Vars. 394, 404).

Summary of Gain and No-Gain Analysis of Variance

In the six classrooms of Group V, students started the third grade with test scores lower than the average for the state. In all six classrooms, the students gained as much or more during the year as the average gain for the state. In four of these six classrooms, the achievement was so great that their scores were as high or higher than the state average by Spring 1977 (see Table 16). In the classrooms that showed such gains, the classes were smaller and the ratio of children to adults was lower. The teachers more often instructed small groups and used a direct approach to teaching reading. They more often used educational equipment and materials including audiovisual equipment. During nonacademic activities they more often asked open-ended questions and children more often made extended responses.

In Group VI, the no-gain classrooms, the teachers more often worked with one child at a time and the other children worked independently. More arts and crafts occurred, and more dramatic play. Teachers were less often directly involved with children, and there was more negative behavior displayed.

To promote better achievement in reading, the implications here for program planning would be, it seems, to encourage teachers to work with small groups, keep engaged with the children, allocate time for reading throughout the day, and use a direct method to teach reading (question-response-feedback).

These findings are very similar to those reported in the partial correlation analysis in the preceding section. The exception is that in this narrower band of ability levels some important variables did emerge (open-ended questions, child extended responses) that did not have an effect over the whole sample.

Analysis Across All Classrooms Of Absence Rate

A high absence rate of students is a problem for teachers and students. The average absence rates for the 45 classrooms range from 1.0 day average per student to 22.5 days average per student. The burden on the teacher is great when students are frequently absent since the teacher must take precious time to help the student catch up. Also, there is a financial loss to schools in their average daily attendance dollars when students are absent.

In the Follow Through Classroom Observation Evaluation 1972-73, we found that what teachers did in classrooms was related to how frequently children were absent from school. We identified process variable that accounted for 62% of the variance in absence rate in third grade classrooms. In classrooms where the students had more choice of materials, activities, and work groups, and when they could ask questions and socialize a little more, they were present more often. Since so much variance was explained by classroom processes, we considered absence rate as an indicator of the students' attitude toward school, i.e., even young children seem to control to some extent how frequently they attend school. We suggest that when children like their experience in their classrooms, they are absent less frequently and when they do not like that experience, they are absent more frequently.

Based on this prior research, we wanted to see whether some classroom variables could be identified that were related to student absence rate in ECE classrooms.

Pearson Product Moment Correlations

Correlations were computed using 150 selected classroom process variables with absence rate. Out of the 150 correlations, 54 were significant at $p < .05$. Variables which had a relationship significant at the $p < .05$ level are included on Table 10.

Test Scores

Classrooms with higher pre- and posttest scores have lower absence rates. We cannot, of course, interpret whether classrooms with lower absence rates are likely to have higher test scores or whether classrooms with higher test scores are likely to have lower absence rates. Regardless of the direction, a significant relationship between test scores and absence rate is identified here. Since classrooms are within districts, there is also a correlation between districts and absence rate. Some districts have much higher test scores and also lower absence rates (Var. 1).

Classroom Organization

The number of aides in the classroom and the ratio of students to adults is related to students' absence rate (Var. 13). The lower the ratio of students to adults, the lower the absence rate (Var. 15, 16). Students were absent more often where there were stationary desks in rows and where they were assigned to seats (Var. 19, 20). They were absent less often where they could select their own seats and groups part of the time (Var. 23).

Group Size

Several variables describing the organization of the groups and the responsibility of the adults were related to absence rate. In classrooms where the adults worked with one child at a time, the children were absent less often (Var. 104, 109, 141, 151, 261, 342, 375, 438). These eight variables describe several situations where aides, volunteers, or teachers attend to one child at a time. Students were also absent less often in classrooms where adults more often observed or attended to small groups of children (Var. 420). Although it sounds contradictory, in classrooms where children more often work independently either in reading or math, they were also absent less frequently (Var. 139, 162). This suggests that children enjoyed the personalized attention but also enjoyed working independently.

Activities and Materials

Three variables describing less task-oriented and more social activities--group time, transition, snack time, and lunchtime (Var. 79, 243, 244)--have a positive relationship with absence rate, i.e., children are absent more frequently in classrooms where these activities occur more frequently.* Wherever adults are less frequently involved with children or the children are not involved in any activity, the absence rate is higher (Var. 77, 272, 351, 355, 359, 368, 454).

Reading and Math Activities

The occurrence of reading and math activities has a negative relationship with absence. This suggests that children are absent less often in classrooms where more rigorous academic activities were occurring. This on-task pattern continues as we find the use of five academic-type materials related to lower absence rate. Variable 30, 31, 239, 240, 241 describe materials, books, and games used in academic activities.

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* This finding is counter to the Follow Through findings that children were absent less frequently in classrooms that had more social interactions.

Interactions

The students seem to attend school more often in classrooms where there is a business-like structured approach to education. The following variables describe a direct teaching method, and all of them have a negative relationship to absenteeism: teachers provide academic instruction (Var. 374), ask academic questions (Var. 354), child responds to question (Var. 362), and receives feedback or acknowledgment (Var. 395, 412). Where more of the total verbal interactions are academic in content, children are absent less often (Var. 435). Interestingly, several variables which describe a more relaxed interaction pattern where children initiate and adults respond are also negatively related to absence rate (Var. 35, 344, 365.) As other studies have also found where adults have to exert more behavior control and where the children express more unhappiness, the absence rate is higher (Var. 436).

Stepwise Regressions

A stepwise regression was computed to see if any set of variables could explain the variance in the absence rate of classrooms. Only one variable was identified with a regression coefficient significant at $p < .05$. This variable describes the percent of time any academic activity is occurring (Var. 242) and it alone explains 26% of the variance in absence rate. This supports the findings in the correlations that children's attendance is better in classrooms which are more academically oriented.

Summary of Absence Rate

The process variables recorded in ECE classrooms relate differently to absence rate than did process variables recorded in the Follow Through study. Follow Through had many more open-classroom types of variables that related to lower absenteeism; ECE has a consistent pattern of having less absenteeism in more structured classrooms that have a lower ratio of children to adults.

Summary of Classroom Analysis

The variables which describe a more structured teacher-directed approach to education were also correlated positively with reading posttest scores. It follows then that in classrooms where the absence rate was lower, the pre- and posttest scores were higher.

Other ECE variables such as the presence of aides in the classrooms were positively associated with reading posttest scores and a lower absence rate. More individualized attention to children was associated with a lower absence rate but not with higher or lower reading test scores. A variety of instructional materials encouraged by the ECE program were associated with reading achievement and lower absence rate.

IV CONCLUSIONS AND RECOMMENDATIONS

The in-depth study of selected ECE classrooms indicates that the instructional methods or processes used in some classrooms are more efficient in teaching reading than those used in other classrooms. Of particular importance is the finding that when there are fewer students per adult, the classroom gain is greater and the absence rate is lower. This relationship was found in the overall partial correlations for classrooms and studied in greater detail in the subgroup comparison of Groups V and VI. Group V, which gained in reading, had a lower ratio of children to adults (6 to 1); Group VI, the no-gain group, had a ratio of 13 to 1.

However, it is not enough merely to have more adults in the classroom; how the groups are organized and managed is of critical importance. Teachers in the classrooms that gained very little (Group VI) more often instructed one child at a time even though their ratio of adults to children was quite high. This organization of staff then left the other students working for longer periods of time on their own. Misbehavior and negative affect occurred more frequently in classrooms organized in this manner.

This does not imply that the children should not be tutored or taught on an individual basis. It does imply that allocating one staff person to work with one student at a time within the class reading period when the total class is trying to work appears not to be an efficient strategy.

In the group of classrooms (Group V) where students made excellent gains in reading, the adults more often worked with small groups of students. They most often used directive teaching methods, providing instruction and asking questions or asking students to read aloud. The students' responses were given immediate feedback. If the response was correct or satisfactory, they received acknowledgment or praise, and if it was incorrect, they were guided to a correct response. These teachers were very successful in keeping students on task and consequently very little misbehavior was recorded in these classrooms.

Interestingly, three of the six classrooms (from Group V) which used these more efficient methods were in schools identified as "increaser schools" and three were in schools identified as "decreaser schools." Our data do suggest that some of the schools in our sample and the classrooms therein do not fit neatly into the classifications of "increaser" or "decreaser schools."

In sixteen classrooms of "decreaser schools," the students started the third grade year with test scores (16.60% to 59.50%) lower than the average for the state (67.7%). Nine of these low entering classrooms gained as much or more (14.9% to 24.8% gain) during the third grade as did the average classrooms in the state (14% average gain). Two of the classrooms in "decreaser schools" not only showed striking improvement, but achieved scores by the end of third grade as high as the state average for third grade (81.7% average).

In the twenty classrooms of "increaser schools," four started the third grade with scores above the average for the state. Twelve of the twenty gained more than the average gain for the state. Six of the twenty had scores at or above the state average for third grades at the end of the third grade year.

These data suggest that, over time, ECE is effective. When the thirty-eight sample classrooms entered school in first grade, they were in the lowest 20% percentile in the state. Now eight classrooms can no longer be defined as low achieving; they are at or above the state average. Twenty of the thirty-eight classrooms are progressing nicely; they gained more than the average classroom gain between the end of second and third grade.

In the past, student achievement in California has most often been expressed in terms of the average percent of correct answers on the California assessment test by grade level for each school. School level scores are reported each year, i.e.:

	Spring 1976	Spring 1977
School X		
Second Grade	42%	41.5%
Third Grade	60.5	60
School Y		
Second Grade	69	69.5
Third Grade	80	81
State average		
Second Grade	67.7	68.4
Third Grade	81.4	81.7

The conclusion of such reporting is that School X's second and third grade classes have declining test scores (42%-41.5%; 60.5%-59%) and they are failing in their efforts to teach children since they are below the average for the state. Actually, the gain in percent correct from second grade to third grade is greater in School X; between second grade 1976 and third grade 1977, there is 18% change, whereas the change in School Y is only 12% between second grade and third grade and the average change for the State is 13%.

Local papers normally report the school scores by percentile and rank schools accordingly; thus, School X is likely to be at the bottom of the list. The fact that the teachers in School X have been able to improve the reading of low-achieving children almost a third more than the average second grade to third grade change for the State is ignored in this type of reporting.

The practice of reporting achievement in terms of school scores also ignores differences in the performance of teachers and students within the schools. Another problem in this type of reporting is in using schools as the level of analysis. This practice has recently received sharp criticism. In the American Sociological Review, Alexander and McDill summarize the school-level studies of Coleman (1966), Mostellen and Moynihan (1972), Jencks (1972), McDill and Riply (1973), Alexander and Eckard (1975), the authors conclude that "educational outcomes are largely independent of all school-to-school differences. These results of the research on schools have been reproduced over a wide range of school outcomes on numerous samples of students with various analytic strategies. The acceptance of the proposition that school level analyses are unproductive is reflected in the redirection of recent research on teaching and learning."

Many requests for proposals issued by the National Institute of Education and the U.S. Office of Education specify their preference for classroom or student levels of analysis and request that classroom processes be documented. Several such research efforts by Wiley and Harnischfeger (1976), Brophy (1975), Gage (1975), and Stallings (1975) report that quality of instruction within classrooms is related to student achievement. These researchers have noted that differences in student outcomes are associated with differences in teachers' classroom practices. Their findings, like those of this report, suggest that teachers who organize classrooms so that students are kept on task and not distracted have students who perform better on achievement tests. Such differences in teaching processes and student achievement are not detected in research that uses the school as the unit of analysis. The influence upon student achievement by teachers within schools is systematically neglected in traditional research on school effects. The assumption that education within schools is homogeneous is not a reasonable one.

The present research has been dedicated to the study of classroom instructional processes within ECE schools identified as performing in the lowest quintile on State assessment tests. We have found that teachers within schools vary considerably in their instructional methods and these differences have impact upon the quantity and quality of schooling children receive.

We recommend that findings from the study be used in program development efforts to assist teachers in organizing classrooms and interacting with students in those ways found to be most efficient.

We recognize that this study is limited in its scope. It focuses on classroom instructional processes related to reading; it does not address several important outcomes for children expected as a result of the implementation of ECE. A more thorough analysis should assess classroom processes related to such student competences as the ability to work together cooperatively, to ask task-related questions, to identify problems (both academic and social), to consider alternatives and probable consequences, and to generate solutions. Attitudes toward oneself and the school should also be examined. The data available do not permit these kinds of analyses, but such data could be collected through child-focused observation and selected affective and cognitive tests. We recommend that further study of ECE should include such measures in order to more fully and fairly examine the impact of the program upon child growth and development.

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Appendix A

CLASSROOM OBSERVATION INSTRUMENT

Classroom Summary Information

FOR NCS USE ONLY				
⓪	⓪	⓪	⓪	⓪
①	①	①	①	①
②	②	②	②	②
③	③	③	③	③
④	④	④	④	④
⑤	⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨	⑨

DIRECTIONS: Make sure that all of the identifying information has been entered on the Classroom Summary Information form prior to your observation of physical environment. Do not make any stray marks outside the boxes provided in places where written information is required. Make sure you code the classroom summary information form booklet Identification Number in the I. D. grid of all booklets used in the observation.

TEACHER NUMBER							
⓪	⓪	⓪	⓪	⓪	⓪	⓪	⓪
①	①	①	①	①	①	①	①
②	②	②	②	②	②	②	②
③	③	③	③	③	③	③	③
④	④	④	④	④	④	④	④
⑤	⑤	⑤	⑤	⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦	⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨	⑨	⑨	⑨	⑨

Grade
Ⓚ
①
②
③
Ⓜ

OBSERVER NUMBER			
⓪	⓪	⓪	⓪
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

TODAY'S DATE					
MO.		DAY		YR.	
⓪	⓪	⓪	⓪	⓪	⓪
①	①	①	①	①	①
②	②	②	②	②	②
③	③	③	③	③	③
④	④	④	④	④	④
⑤	⑤	⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨	⑨	⑨

I. D. NUMBER			
⓪	⓪	⓪	⓪
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

Teacher ____________________

School ____________________

City ____________________

Observer ____________________

CLASSROOM SUMMARY INFORMATION

⓪①②③④ Number of teachers that regularly work in the classroom.

⓪①②③④ Number of aides that regularly work in the classroom.

⓪①②③④ Number of volunteers/visitors present today.

Classroom Summary Information (Cont.)

A		B	
⓪	⓪	⓪	⓪
①	①	①	①
②	②	②	②
③	③	③	③
④	④	④	④
⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨

A. Number of children enrolled

B. Number of children present today

Total Class Duration

- ○ 2½ hours
- ○ 3 hours
- ○ 3½ hours
- ○ 4 hours
- ○ 4½ hours
- ○ 5 hours
- ○ 5½ hours
- ○ 6 hours
- ○ 6½ hours
- ○ 7 or more hours

NCS Trans-Optic 5387A-3

Physical Environment Information
(Mark all that apply.)

For each of the items below, mark all that apply:

① Present
② Used today

Seating Patterns:
- ○ Movable tables and chairs for seating purposes.
- ○ Stationary desks in rows.
- ○ Assigned seating for at least part of the day.
- ○ Children select their own seating locations.
- ○ Teacher assigns children to groups.
- ○ Children select their own work groups.

GAMES, TOYS, PLAY EQUIPMENT
- ①② small toys (trucks, cars, dolls and accessories
- ①② puzzles, games
- ①② wheel toys
- ①② small play equipment (jumpropes, balls)
- ①② large play equipment (swings, jungle gym)
- ①② children's storybooks
- ①② animals, other nature objects
- ①② sandbox, water table
- ①② carpentry materials, large blocks
- ①② cooking and sewing supplies

INSTRUCTIONAL MATERIALS
- ①② Montessori, other educational toys
- ①② children's texts, workbooks
- ①② math/science equipment, concrete objects
- ①② instructional charts

AUDIO, VISUAL EQUIPMENT
- ①② television
- ①② record or tape player
- ①② audio-visual equipment

GENERAL EQUIPMENT, MATERIALS
- ①② children's own products on display
- ①② displays reflecting children's ethnicity
- ①② other displays especially for children
- ①② magazines
- ①② achievement charts
- ①② child-size sink
- ①② child-size table and chairs
- ①② child-size shelves
- ①② arts and crafts materials
- ①② blackboard, feltboard
- ①② child's own storage space
- ①② photographs of the children on display

OTHER
- ①② please specify ......

MAKE NO

STRAY MARKS

IN BLANK AREAS

CLASSROOM OBSERVATION PROCEDURE

CLASSROOM CHECK LIST (be sure to code EVERYONE in the class)

		ONE CHILD	TWO CHILDREN	SMALL GROUPS	LARGE GROUPS
	1. Snack, lunch	T ①②③	T ①②③	T ①②③④	T ①②
		A ①②③	A ①②③	A ①②③④	A ①②
		V ①②③	V ①②③	V ①②③④	V ①②
		I ①②③	I ①②③	I ①②③④	I ①②
	2. Group time	T ①②③	T ①②③	T ①②③④	T ①②
		A ①②③	A ①②③	A ①②③④	A ①②
		V ①②③	V ①②③	V ①②③④	V ①②
		I ①②③	I ①②③	I ①②③④	I ①②
	3. Reading Out Loud	T ①②③	T ①②③	T ①②③④	T ①②
		A ①②③	A ①②③	A ①②③④	A ①②
		V ①②③	V ①②③	V ①②③④	V ①②
		I ①②③	I ①②③	I ①②③④	I ①②
	4. Arts, Crafts	T ①②③	T ①②③	T ①②③④	T ①②
		A ①②③	A ①②③	A ①②③④	A ①②
		V ①②③	V ①②③	V ①②③④	V ①②
		I ①②③	I ①②③	I ①②③④	I ①②
	5. Reading Silently	T ①②③	T ①②③	T ①②③④	T ①②
		A ①②③	A ①②③	A ①②③④	A ①②
		V ①②③	V ①②③	V ①②③④	V ①②
		I ①②③	I ①②③	I ①②③④	I ①②
○ TV ○ Audio-Visual Materials ○ Exploratory Materials ○ Math and Science Equipment ○ Texts, Workbooks ○ Puzzles, Games	6. Numbers Math Arithmetic	T ①②③	T ①②③	T ①②③④	T ①②
		A ①②③	A ①②③	A ①②③④	A ①②
		V ①②③	V ①②③	V ①②③④	V ①②
		I ①②③	I ①②③	I ①②③④	I ①②
	7. Reading Alphabet Lang. Development	T ①②③	T ①②③	T ①②③④	T ①②
		A ①②③	A ①②③	A ①②③④	A ①②
		V ①②③	V ①②③	V ①②③④	V ①②
		I ①②③	I ①②③	I ①②③④	I ①②
	8. Social Studies Geography	T ①②③	T ①②③	T ①②③④	T ①②
		A ①②③	A ①②③	A ①②③④	A ①②
		V ①②③	V ①②③	V ①②③④	V ①②
		I ①②③	I ①②③	I ①②③④	I ①②
	9. Science Natural World	T ①②③	T ①②③	T ①②③④	T ①②
		A ①②③	A ①②③	A ①②③④	A ①②
		V ①②③	V ①②③	V ①②③④	V ①②
		I ①②③	I ①②③	I ①②③④	I ①②
	10. Drill on Practice	T ①②③	T ①②③	T ①②③④	T ①②
		A ①②③	A ①②③	A ①②③④	A ①②
		V ①②③	V ①②③	V ①②③④	V ①②
		I ①②③	I ①②③	I ①②③④	I ①②
	11. Blocks Trucks	T ①②③	T ①②③	T ①②③④	T ①②
		A ①②③	A ①②③	A ①②③④	A ①②
		V ①②③	V ①②③	V ①②③④	V ①②
		I ①②③	I ①②③	I ①②③④	I ①②
	12. Dramatic Play Dress-Up	T ①②③	T ①②③	T ①②③④	T ①②
		A ①②③	A ①②③	A ①②③④	A ①②
		V ①②③	V ①②③	V ①②③④	V ①②
		I ①②③	I ①②③	I ①②③④	I ①②
	13. Active Play Music, Dancing	T ①②③	T ①②③	T ①②③④	T ①②
		A ①②③	A ①②③	A ①②③④	A ①②
		V ①②③	V ①②③	V ①②③④	V ①②
		I ①②③	I ①②③	I ①②③④	I ①②
	14. RELIABILITY SHEET ○				

			ONE CHILD	TWO CHILDREN	SMALL GROUPS	LARGE GROUPS
15. Practical Skills Acquisition **Sewing, Cooking, Pounding, Sawing**			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			i ①②③	i ①②③	i ①②③④	i ①②
16. Observing			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			i ①②③	i ①②③	i ①②③④	i ①②
17.. Social Interaction	Ob Ⓒ	Ⓣ	T ①②③	T ①②③	T ①②③④	T ①②
	②	Ⓐ	A ①②③	A ①②③	A ①②③④	A ①②
	Ⓢ	Ⓥ	V ①②③	V ①②③	V ①②③④	V ①②
			i ①②③	i ①②③	i ①②③④	i ①②
18. Unoccupied Child			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			i ①②③	i ①②③	i ①②③④	i ①②
19. Discipline			T ①②③	T ①②③	T ①②③④	T ①②
			A ①②③	A ①②③	A ①②③④	A ①②
			V ①②③	V ①②③	V ①②③④	V ①②
			i ①②③	i ①②③	i ①②③④	i ①②
20. Transitional Activities		Ⓣ	T ①②③	T ①②③	T ①②③④	T ①②
		Ⓐ	A ①②③	A ①②③	A ①②③④	A ①②
		Ⓥ	V ①②③	V ①②③	V ①②③④	V ①②
			i ①②③	i ①②③	i ①②③④	i ①②
21. Classroom Management		Ⓣ	T ①②③	T ①②③	T ①②③④	T ①②
		Ⓐ	A ①②③	A ①②③	A ①②③④	A ①②
		Ⓥ	V ①②③	V ①②③	V ①②③④	V ①②
			i ①②③	i ①②③	i ①②③④	i ①②
22. Out of Room		Ⓣ	T ①②③	T ①②③	T ①②③④	T ①②
		Ⓐ	A ①②③	A ①②③	A ①②③④	A ①②
		Ⓥ	V ①②③	V ①②③	V ①②③④	V ①②
			i ①②③	i ①②③	i ①②③④	i ①②

NUMBER OF ADULTS IN CLASSROOM ⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

PREAMBLE

Focus Person Codes:
- 00 - The original class teacher
- 1-76 - Child codes
- 77 - Volunteer
- 88 - Teacher other than designated class teacher
- 99 - Aide to teacher

Activity	Focus Person Code
⓪⓪	⓪⓪
①①	①①
②②	②②
③③	③③
④④	④④
⑤⑤	⑤⑤
⑥⑥	⑥⑥
⑦⑦	⑦⑦
⑧⑧	⑧⑧
⑨⑨	⑨⑨

FOCUS PERSON

○ Child
○ Teacher
○ Aide
○ Volunteer

CONTINUATION OF PREVIOUS FOCUS ACTIVITY

○ Yes
○ No

Focus Person's Name and Number

(Do not write outside this box)

Number of Children ①②ⓈⓁ

FOR NCS USE ONLY

⓪	⓪	⓪	⓪	⓪
①	①	①	①	①
②	②	②	②	②
③	③	③	③	③
④	④	④	④	④
⑤	⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥	⑥
⑦	⑦	⑦	⑦	⑦
⑧	⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨	⑨

ADULT	Directing	Participating	Observing	Not Involved
Teacher	○	○	○	○
Aide	○	○	○	○
Volunteer	○	○	○	○

TIME STARTED

Hour	Minute	
⑧⑨⑩⑪⑫	⓪①②	⓪①②③④
①②③④⑤	③④⑤	⑤⑥⑦⑧⑨

1	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

2	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

3	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

4	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

5	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

6	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

7	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

8	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

9	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

10	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

11	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

12	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

13	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

14	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

15	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

16	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

17	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

18	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

19	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

20	Who	To Whom	What	How	
Ⓡ	Ⓣ Ⓐ Ⓥ	Ⓣ Ⓐ Ⓥ	① ② ③ ④ ⑤	Ⓗ Ⓤ Ⓝ Ⓣ	
Ⓢ	Ⓒ Ⓓ ②	Ⓒ Ⓓ ②	⑥ ⑦ ⑧ ⑨ ⑩	Ⓠ Ⓖ Ⓟ	
Ⓒ	Ⓢ Ⓛ [illegible] Ⓜ	Ⓢ Ⓛ [illegible] Ⓜ	⑪ ⑫ [illegible] Ⓧ	Ⓞ Ⓦ [illegible]	Ⓐ Ⓑ

21	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

22	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

23	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

24	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

25	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

26	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

27	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

28	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

29	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

30	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

31	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

32	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

33	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

34	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

35	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

36	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

37	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

38	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

39	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

40	Who	To Whom	What	How
R	T A V	T A V	1 2 3 4 5	H U N T
S	C D 2	C D 2	6 7 8 9 10	Q G P
C	S L AN M	S L AN M	11 12 RV X	O W DP A B

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Appendix B

OPERATIONAL DEFINITIONS
FOR
CLASSROOM OBSERVATION INSTRUMENT

A. Summary of Five-Minute Observation

The Who and To Whom codes are used to indicate the participants in an interaction. These codes make it possible to designate the person or group of persons initiating or receiving an action. The letter M refers to such items as typewriters, tape recorders, films, and the like.

The 12 What codes refer to the action categories that have survived several years of use and review. They preserve the distinctions that seem to be important in describing varying classroom processes.

The How categories are used in conjunction with the What codes to specify emotional or descriptive aspects of an interaction and to define strategies used to control behavior.

Operational definitions of the codes used in the classroom observation instrument are given in the following subsections.

B. Operational Definitions

1. The Who Column

The Who column indicates who is doing the talking or the action:

Code	Code Usage
T - Teacher	The one person who is ultimately responsible for the everyday conduct and instruction of the classroom.
A - Adult	Any adult in the classroom other than the teacher.
V - Volunteer	Any child who volunteers a response to a question which has not been directed specifically to him. The question may have been directed to another child or to a whole group of children.

Code	Code Usage
C - Child	When the focus of an observation is on a specific child, that child is "C" (all other children are "D" - Different Child). When the focus is on an adult, C refers to any individual child with whom the adult is interacting.
D - Different Child	A second child in an interaction when the focus child, C, is being observed.
2 - Two Children	
S - Small Group	Three to 8 children.
L - Large Group	Minimum of nine children and up to as large a group as possible without including all children in the classroom (e.g., total class minus one).
An - Total Class	All children present in the classroom.
M - Machine	Record player, tape recorder, TV, and so on.

2. The To Whom Column

The To Whom column indicates the person, group, or machine that is being talked to or interacted with:

Code	Code Usage
T	These codes are all the same as the codes for the Who column.
A	
V	
C	
D	
2	
S	
L	
An	
M	

3. The What Column

It is assumed that all interactions coded in the What column are verb verbal unless marked NV (nonverbal). (NOTE: NV and certain codes from the How column are used in the examples below. See Section 4 which describes the How column.)

Code	Code Usage	
1 - Command or Request	Code 1 asks for a response free of argument or speculation. There is one expected, acceptable response that is carried out, verbally or nonverbally:	
	• "Open the door, please."	TS1
	• "Read this sentence."	TC1A
	• "Draw a line."	TC1
	• "Zip me up."	CT1
	• "Gimme that book."	CD1
1Q - Direct Question	1Q questions ask for direct recall of material already learned or anticipate a specific or automatic response, a yes/no answer, or a sample choice. Three questions seek an answer which can be expressed in a single word or short phrase.	
	• "In the story did you like Mr. Brown?"	TC1Q
	• "What is 1/2 and 1/2?"	CD1QA
	• "What was on the list of mountain climbing equipment we made yesterday?"	TL1Q
	• "If you had 2 pears and 3 apples, what would you have 5 of?"	TS1Q
	• "Is this dog a Great Dane or a St. Bernard?"	CD1Q

Code	Code Usage
2 - Open-Ended Question	Code 2 questions are those that allow a free expression of ideas or feelings and invite opinions. Code 2 questions encourage responses that require: interpretation of ideas, relationships of cause and effect, making of comparisons, reasoning, application of previously learned material to a new situation, and describing a process. This question requires the respondent to specify the cognitive and/or behavioral steps that must be gone through in order to solve a problem or come up with an idea. Code 2 may be phrased as a statement as well as a question. • "What do you think of the Eskimo way of life?" TC2 • "Why did you like Mr. Brown in the story?" CD2 • "State the problem in your own words." TC2 • "Tell me how an electric train works." CD2 • "In what ways are the things in this picture alike?" TC2 • "Use these sticks to see if you can find all the different groupings that add up to 10." TC2A
3 - Response	Code 3 is a response to a command (Code 1), a question (Code 1Q, 2), or corrective (Code 9). When the response is concerned with basic academic skills, Code 3 is used with A in the "How" column (see definition for A). Code 3 is used with B in the How column when it follows acknowledgment, praise, or a corrective for behavior (see definition for B). • "Read the next sentence, Jimmy." TC1A "The dog chased the ball." CT3A • "Will you add 2 and 2?" TC1QA "2 and 2 makes 4." CT3A

Code	Code Usage	
	- "Guess what I've brought for you."	CT2
	"Flowers--or an apple."	CT3
	- "Please shut the door."	TC1
	The child shuts the door (nonverbal).	CT3NV
	- "Did you save my painting?"	CT1Q
	"Yes, it's hanging up."	TC3
	- "We can't hear when you do that, Alice."	TC9GB
	Alice is quiet.	CT3NVB
4 - Instruction, Explanation	Code 4 is used when a teacher or child is: (1) Verbally giving new information to others, reviewing lessons, or explaining rules of behavior. (2) Nonverbally engaged in demonstrating or in an activity that is productive, organized, or exploratory When the interaction is concerned with the basic skills of reading, writing, spelling, and computation, Code 4 is used with A in the How column.	
	- "Flowers grow everywhere. There are many different kinds of flowers and they grow in many shapes and colors."	CL4
	- "Here is a game called 'Community People.' You play by matching the pictures on your card with those on the large card."	TS4
	- "This is how I'd like you to do these exercises: First, fold your paper in half like this. Then in half again like this. Then put the first problem in this square and the second here.	TS4
	- "I made my puppet out of an old sock and I made his eyes from pieces of a crayon (holding puppet)."	CS4

Code	Code Usage
	• "You have to add 3 to 7 here and carry the 1 over to this column; then add those." CD4A
	• Child learning the shape of a letter by running his finger over a sandpaper letter on a card. (NOTE: When the action involves only one person, the Who and To Whom columns are coded with the same letter.) CC4NVA
	• Child reading aloud to a small group of children. CS4A
	• Child reading to himself. CC4NVA
5 - General Comments/ General Action	Greetings, personal compliments, social or nontask-related comments and remarks. Irrelevant remarks are also coded 5.
	• "Hello." "Good morning." TC5
	• "That's a pretty dress." CT5
	• "I can't stand you today." CD5N
	Classroom management activities, general movement about the room, mild horseplay, eating, napping, are coded 5NV. (5NV is coded only if there is no talking along with the general action; otherwise, the observer codes the kind of remark that is accompanying the general action.)
	• Child setting the table for lunch or snack. CC5NV
	• Two children jostling in a line. 225NV
	• Teacher walking around the room. TT5NVX
6 - Task-Related Comment	Code 6 is used for a statement about the activity or problem at hand in which children and/or adults are involved.
	• Two children making clay animals: C: "This clay makes my hands sticky." CD6 D: "The horn won't stay on my cow." DC6 C: "Mine doesn't have a horn." CD6

Code	Code Usage

- Teacher is conducting a Show and Tell period:

T:	"What did you do over the weekend?"	TL1Q
C:	"I went to the zoo with my daddy."	CT3
D:	"The tigers are really big."	DT6
C:	"The elephants are bigger."	CD6

- Three children are working with metal washers and a balance:

C:	"I think 3 big washers will balance 4 small ones."	C26A
D:	"I'll try it."	DC6A
D:	"I sure like your cowboy boots."	DC5
C:	"It balanced!"	C26 A

7 - Acknowledge/ Encouraging

An indication that a response, product or behavior is recognized or agreed with is coded 7. Another form of acknowledgment is to repeat someone else's statement immediately. This code also includes encouraging, supportive remarks.

Code 7 with A in the How column is used to indicate acknowledgment of a response having to do with academic subject matter. Code 7 is used with B in the How column to indicate acknowledgment of a response having to do with behavior.

• Nodding (nonverbal) to indicate the painting is acceptable.	TC7NV
• "Yes, that's the right way to knead clay."	TC7
• "That math problem is correct."	TC7A
• "Thank you for sitting down when I asked you."	TC7B
• "What do you think is in this bag, Peter?"	TC2
"I think it's a carrot."	CT3
"You think it's a carrot."	TC7

Code | **Code Usage**

8 - Praise

Code 8 is used for praise of a response, product or behavior. Praise in academic areas is coded 8 with A in the How column (see definition of Academic on p. 49); praise for behavior is coded 8 with B in the How column (see definition for Behavior on p. 50).

- "What a pretty picture you've made!" TC8
- "I like the story you wrote about your trip, Jim." TC8A
- "You've done a fine job on your math workbook." TC8A
- "I'm really proud of you, class, for behaving so well while Mr. Jones was here. TL8B

9 - Corrective Feedback

Corrective Feedback is the attempt to change or modify a response, product, or behavior. Code 9 is used when the subject of the observation tries to change another's behavior or corrects his answers or work.

This code may be used alone or with modifiers from the How column, specifically G, Q and N.

When Code 9 is used alone, the subject of the observation states that the response or behavior of another is not acceptable; either an incorrect answer or misbehavior. No correct answer is given nor is there any attempt to guide the respondent to a correct answer.

Code 9 coded with a Q, indicates that the corrective feedback has been given in question form. This may be a rephrasing of the original question, a repeat of the original question, a request to reconsider the answer.

Code 9 coded with G indicates that the correct answer is given to the respondent.

- No, that's not the right answer. TC9

Code	Code Usage	
	• Fourteen times three is not 46.	TC9
	• Are you sure that's the correct way to spell "table?"	TC9Q
	• "What's the capital of France?"	TC1Q
	"London"	CT3
	Think about that, what's the capital of France?	TC9Q
	• No, that word is spelled b·u·i·l·d.	TC9G
	• Paris is the capital of France.	TC9G
10 - Process Feedback	Process Feedback is coded when the teacher goes beyond merely providing the right answer and discusses the cognitive or behavioral processes that are to be gone through in arriving at the answer. In other words, he reviews the question or problem with the child at length, telling him how to go about responding to it and not merely what the correct answer is. Process feddback occurs most frequently following errors, when the teacher explains the reasoning processes to be gone through to arrive at the correct answer or explains the erroneous processes followed by the child to arrive at the wrong answer. Process feedback may sometimes follow correct answers, as when the teacher elaborates on the response to verbalize the knowledge it represents.	
	• Try to remember the definition of a pneinsula and see if you still think Panama is Peninsula.	TC10
	• Think for a moment. When we talked about syllables yesterday, we said that every syllable must have a vowel, so "th" would not be a syllable.	TC7

Code	Code Usage

- Yes, we know that we should use a capital letter since it is a proper name, and all proper names begin with capital letters. TL7

11 - No Response, Don't Know

Code 11 is used for no response when a response is called for and none is forthcoming to complete the interaction. The no response may be non-verbal (NV) or a statement that the answer is not known or the question is not understood.

- Teacher, may I be next? CT1Q
  Teacher does not reply because she is talking to another child. TC11NV
- Jonny, did you do the third problem? TC1Q
  Johnny looksdown at his desk and gives no answer. CT11NV
- Johnny, did you do the third problem? TC1Q
  I don't understand it. CT 11

12 - Observing, Listening, Monitoring

Code 12 is used when the subject of the observation is listening to or watching other people, other activities, TV, slides, films, and the like.
If the focus person is listening to another who is talking, code S which indicates that simultaneous behaviors are occurring. If a teacher is monitoring a student or group of students who are working, but no interaction is occurring, do not code the S.

- A child sitting on his chair is watching a small group on the rug play with blocks. CS12
- Teacher listens to a child tell about his trip to Mexico. (S)TC12
- Teacher stands watching the children and the activities in the room. TL12

Code	Code Usage	
NV - Nonverbal	When the action being coded is not accompanied by words, NV is coded in the What column, along with the other relevant codes.	
	• Child laughing.	CC5NVH
	• Teacher passes out material silently to a small group.	TS5NV
	• Child taps the teacher's arm without speaking, requesting her attention.	CT1NVT
	• Child sits down in response to a request from the teacher.	CT3NV
X - Movement	Code X is used when the subject of the observation moves and for movement of a person with whom the subject is interacting. X can be used with any What code. If the movement is nonverbal and no What code is applicable, code X with 5 (general action).	
	• Teacher moves about the room while lecturing to the class.	TL4X
	• Child asks, "Miss Smith, will you help me?" while moving to the teacher.	CT1QX
	• Child walks over to close the door in response to a request from the teacher.	CT3NVX
	• Child runs to the door when recess is announced.	CC5NVX

4. The How Column

Categories in the How column are used in conjunction with the What codes.

Code	Code Usage	
H - Happy	Obvious behavioral expressions of happiness or positive affect, such as laughing, smiling, giggling.	
	• A child jumping up and down, clapping hands and grinning over a new puppet.	CC5NVH
	• A child laughing at a joke.	CC5NVH
	• Teacher smiles as she says, "What are you doing?"	TC1QH
	• Child smiles in reply to the teacher's praise.	CT3NVH
	• Two girls giggling and talking in the corner.	225H
U - Utilitarian	Code "U" is used when the focus adult requests or directs children in "getting the show on the road" transition activities. The code is also used for any responses to such directions.	
	• Teacher tells children to clear their desks	TL1U
	• Child asks teacher if he can have a pencil	CT1QU
N - Negative	Expressions of annoyance or anger, negative content (e.g., sarcasm, insults, threats), scolding, rejection, destructive behavior.	
	• "You're stupid!"	CD5N
	• Teacher, red-faced and tight-lipped with anger, glares at class.	TL12N
	• "Johnny, if you can't leave Alice alone, I will ask you to sit in the corner."	TC9NB
	• Child hits child ahead of him in line.	CD5NVNT
	• Child throws jar of paint on the floor in anger.	CC5NVN

Code	Code Usage	
T - Touch	Whenever one person touches another person, T is coded--with H to denote a positive touch, with N to denote a negative touch (hit, slap, pinch)	
	• Girl pinches another girl's arm.	CD5NVNT
	• Teacher puts her arm around a child and smiles as she says, "Jenny, will you help Margaret with her puzzle?"	TC1QHT
	• Teacher moves around the class and touches a child on the head momentarily as she passes.	TC5NVXT
	• Teacher holds child's hand.	TC5NVT
Q - Question	Coded with 1 for a direct question and with 9 when corrective feedback is in question form.	
	• "Are you sure that 8 is the correct answer?"	TC9QA
	• "What color should I use?"	CT1Q
	• "Didn't I tell you not to bother Jimmy?"	TC9QB
	• "You weren't paying attention when I explained it, were you?"	TC9QB
G - Guide	G is coded with 9 when corrective feedback gives the correct answer or the expected behavior.	
	• "It might work better if you turned it around."	TC9G
	• "Sit down so the others can see, Gerald."	TC9GB
	• "The right answer is 144"	TC9GA
P - Propriety of Response	The code is used only with the 3 code (response) and will indicate that the child gave an incorrect answer. The incorrectness of response may be determined in two ways: first, if the observer knows for certain that the child's response is incorrect. (This will only be in situations where the question is concerned with a subject that is common knowledge.) The second means	

Code	Code Usage
	of determining an incorrect answer is if the teacher makes some positive action suggesting dissatisfaction with the response, explicitly explaining that the child's answer is incorrect or only partially correct, giving the correct answer, or asking someone else to answer the same question. • Marie, who was the hero of the story we re read yesterday? TC1QA Prince John CT3PA No, that's not correct. TC9A
O - Organizing, Structuring	This code is used when the teacher makes explicit, the organization of materials or subject matter to be taught and the way in which it will be taught. This may be done by: (1) reviewing, (2) stating objectives, (3) outlining the lesson content, (4) identifying transitions from one lesson to another, (5) indicating important points, and (6) summarizing. • Yesterday, we learned that ecology is a science that deals with both living and non-living things. TAn4AO • In today's lesson I want you to learn about ECOSYSTEM. TAn4AO • This is a very important point, and I want you to remember this." TAn6AO
W - Worth, Feelings	Child statements of self-worth and exclamations of accomplishment are coded with a W. This code is also used when concern is being expressed about current physical or emotional hurt. It is also used for a discussion about feelings in general. "W" may be coded with any "What" code. • What's the matter, Sue?" TC2W • Look, I did it! I finished my paper! CT6AW • I feel sad. CT5W

Code **Code Usage**

Dp - Duration of Process

This code identifies the length of each segment of an interaction. All segments are to be defined as brief or long. A segment (coded on one frame) is considered brief if it is only a phrase or partial sentence. A segment is long if it is at least one sentence. Only long segments are to be coded on the frame using the Dp code. Brief statements will have no code.

• What's 3 times 9?	TC1QA
• 39	CT3A F
• Think about that; go back and remember what 2 times 9 is, and add 9 to your answer.	TC10ADp

A - Academic

Interactions that have to do with the development of basic skills as measured on achievement tests: reading (letter and word recognition, vocabulary, pronounciation, grammar), writing, and computation (number recognition, counting, adding, subtracting), science and social studies are coded A.

• "What is 2 plus 2?"	TC1QA
"Two and 2 is 5."	CT3A
"No, it's 4."	TC9GA
• "You read beautifully today, Aaron."	TC8A
• "Will you show me how to do this problem, Robert?"	CD1QA
• "I figured out that word all by myself!"	CT6WA

Code	Code Usage	
B - Behavior	Describes interactions concerned with classroom behavior (deportment, conduct). B is used only with the feedback codes (7, 8, 9) and with the responses thereto.	
	• "Sit down--now!"	TC9B
	Child sits down.	CT3NVB
	• "You were very quiet in group time today, Ralph, and we all appreciated it. Good for you!"	TC8B
	Ralph smiles.	CT3NVHB
	• "Betty, please go over and work on your collage instead of bothering Gina.	TC9GB
	Betty replies, "O.K."	CT3B

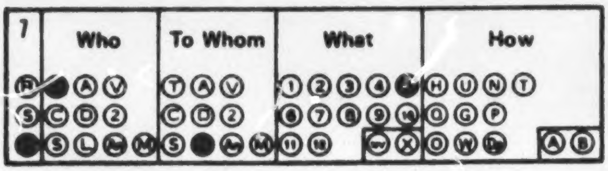
3. The Ⓡ, Ⓢ, and Ⓒ Codes

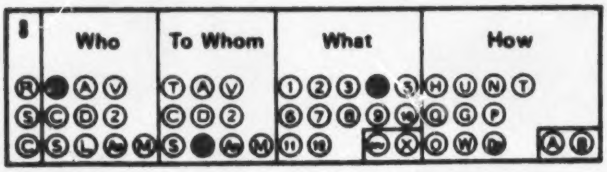
Ⓡ - REPEAT, Ⓢ - SIMULTANEOUS, and Ⓒ - CANCEL are located in the left margin of each interaction frame.

Code	Code Usage
Ⓡ - Repeat	If the interaction being observed continues without change or interruption, code Ⓡ is used in subsequent frames approximately every 5 seconds until the action is interrupted by another interaction, or stops. Ⓡ repeats the interaction from the frame above.
Ⓢ - Simultaneous	The simultaneous code is used only with the 12 code and in the adult focus observations. The code indicates that the teacher is listening to a student speak or read aloud.

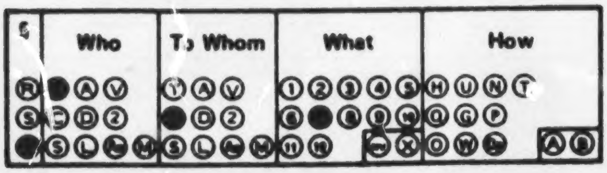
Code	Code Usage
Ⓒ - Cancel	When a mistake is made in coding an interaction, Code Ⓒ is used in the left margin of the miscoded frame and the next frame is coded correctly.

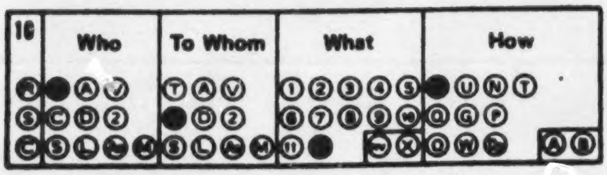
Teacher is lecturing to a large group. Observer mistakenly codes TL5. Code Ⓒ is used in that frame to show the error and Code TL4 is marked in the following frame:





Observer is coding an interaction. She forgets a code, is momentarily blank. She records Code Ⓒ and begins again, for example:





MEANS AND STANDARD DEVIATIONS OF ECE AND FOLLOW THROUGH THIRD GRADE CLASSROOMS

Having used the same observation system at the same grade level as that of Follow Through (FT) study, we found it of interest to see whether ECE classroom processes would be similar in frequency of occurrence to those in the Follow Through study. (Both Follow Through and Non-Follow Through classroom are included in these data.) Means and standard deviations were computed for ECE and compared to the Follow Through study's means and standard deviations (see Appendix C). While the two data sets are very similar, there are some interesting differences. Although class size is similar for both groups (Var. 10), the ratio of students to adults is much lower for ECE (Var. 15). This higher proportion of adults may explain why the ECE adults more often work with one child or a small group, whereas Follow Through adults more frequently worked with large groups or more children (Var. 155, 157, 158). The difference here suggests that the ECE program is being implemented in that the program specifies that aides and volunteers should be used in the classroom to lower the student ratio and that students should be provided more individual instruction.

(Note: Variables 63, 65, 70, 73, and 74 were modified in the ECE study so that the reading process could be more thoroughly examined. Thus, ECE and Follow Through cannot be compared on these variables: 63, reading aloud; 65, reading silently; 70, drill and practice; 73, music and dance; 75, cooking and sewing.)

MEANS AND STANDARD DEVIATIONS OF ECE AND FOLLOW THROUGH THIRD GRADE CLASSROOMS

Variable Number	Description	Follow Through (N=58)		E C E (N=45)	
		$\overline{X}$	SD	$\overline{X}$	SD
10	Number of children enrolled	27.30	4.83	29.51	7.84
11	Number of children present	25.30	4.42	25.26	7.18
12	Number of teachers	1.00	0.00	1.04	0.21
13	Number of aides	.38	.56	1.06	0.50
14	Number of volunteers present	.73	.94	0.15	0.29
15	Child/teacher and aide ratio (Number of children divided by number of teachers and aides)	21.78	6.64	12.82	4.47
16	Child/adult ratio (Number of children divided by number of teachers, aides and volunteers)	18.59	7.82	12.24	4.56
17	Total school day	6.19	.48	5.23	0.52
18	Movable tables and chairs for seating	.78	.42	0.29	0.45
19	Stationary desks in rows	.36	.49	0.40	0.50
20	Assigned seating for at least part of the day	.89	.32	0.73	0.45
21	Children select their own seating location	.28	.45	0.18	0.39
22	Teacher assigns children to groups	.89	.32	0.80	0.41
23	Children select their own work groups	.25	.44	0.04	0.21
24	Child selection of seating and work groups	.75	1.11	0.69	0.82
25	Games, toys, play equipment present	3.53	1.54	4.07	1.57
26	Games, toys, play equipment used	2.14	1.44	1.60	1.25
27	Instructional materials present	2.92	.84	2.78	0.84
28	Instructional materials used	2.00	.99	1.44	0.99
29	Montessori, other educational toys present	.39	.49	0.24	0.44
30	Montessori, other educational toys used	.19	.40	0.24	0.44
31	Children's texts, workbooks present	1.00	0.00	0.98	0.15
32	Children's texts, workbooks used	1.00	0.00	0.67	0.25

Variable Number	Description	Follow Through (N=58)		E C E (N=45)	
		$\overline{X}$	SD	$\overline{X}$	SD
33	Math/Science equipment, concrete objects present	.64	.49	0.87	0.34
34	Math/Science equipment, concrete objects used	.36	.49	0.53	0.51
35	Instructional charts present	.89	.32	0.89	0.32
36	Instructional charts used	.44	.50	0.60	0.50
37	Audio visual equipment present	1.67	1.12	1.93	0.99
38	Audio visual equipment used	.89	1.01	1.33	1.04
39	General equipment, materials present	7.78	2.66	8.78	1.77
40	General equipment, materials used	4.75	2.38	3.31	2.36
41	Children's own products on display	.81	.40	0.87	0.34
42	Displays reflecting children's ethnicity	.36	.49	0.60	0.50
43	Photographs of the children present	.14	.35	0.18	0.39
44	Total number of different resource categories coded "present" over 3 days	15.89	4.58	17.76	3.96
45	Total number of different resource categories coded "used today" over 3 days	9.78	4.36	7.69	3.52
46	Number of COPs--adult focus	36.97	5.89	31.60	8.57
47	Number of COPs--child focus	19.03	1.30	0.00	0.00
48	Achievement charts present	.50	.51	0.76	0.44
49	Achievement charts used	.17	.38	0.51	0.51
50	Cooking and sewing supplies present	.11	0.32	0.18	0.39
51	Cooking and sewing supplies used	0.00	0.00	0.16	0.37
52	Carpentry materials, large blocks present	0.00	0.00	0.11	0.32
53	Carpentry materials, large blocks used	0.00	0.00	0.09	0.29
54	Sandbox, water table present	.03	.17	0.02	0.15
55	Sandbox, water table used	0.00	0.00	0.00	0.00
56	Magazines present	.50	.51	0.29	0.46
57	Magazines used	.08	.28	0.22	0.42
58	Children's story books present	.94	.23	0.93	0.25
59	Children's story books used	.75	.44	0.44	0.50
60	Total number of CCLs	38.32	6.53	31.60	8.57
61	Lunch, snack	.01	.09	0.24	0.83
62	Group time	2.43	2.79	5.97	7.18
63	Story, music, dancing/reading aloud	5.24	6.01	1.63	2.66
64	Arts, crafts	2.89	3.52	7.32	14.24
65	Guessing games, table games, puzzles/reading silently	1.16	2.92	5.19	8.49

Variable Number	Description	Follow Through (N=58)		E C E (N=45	
		$\overline{X}$	SD	$\overline{X}$	SD
66	Number, math, arithmetic	21.69	7.24	15.05	7.35
67	Reading, alphabet, language development	48.03	10.16	32.13	19.97
68	Social studies, geography	5.23	4.03	2.58	5.20
69	Science, natural world	5.94	8.11	3.56	6.27
70	Sewing, cooking/drill and practice	.21	.81	0.99	2.90
71	Blocks, trucks	.22	.43	0.01	0.06
72	Dramatic play, dress-up	.53	1.30	0.25	1.36
73	Active play/music, dancing	.65	1.56	3.01	4.09
74	Practical skills/cooking, sewing	.10	.34	0.50	1.28
75	Observing (independent child only)	.13	.36	0.44	1.12
76	Social interaction	1.45	2.60	1.04	1.53
77	Unoccupied child	.37	.82	0.38	0.75
78	Discipline	.17	.33	0.38	1.11
79	Transitional activities	.99	3.02	7.24	4.51
80	Classroom management	.76	1.34	4.91	5.54
81	Out of room	1.79	2.61	7.18	8.15
82	Wide variety of activities, concurrent	1.20	.23	1.24	0.40
83	Wide variety of activities, over one day	4.95	1.07	4.93	1.64
84	Approximate number of children in the classroom in any activity	25.28	4.45	25.86	6.63
85	Teacher without children	11.89	13.60	6.63	8.92
86	Teacher with one child	7.64	12.54	12.46	12.80
87	Teacher with two children	2.14	4.56	2.28	3.17
88	Teacher with small group	13.00	10.86	26.87	16.13
89	Teacher with large group	65.33	24.96	51.75	19.49
90	Overall teacher occurences	62.53	11.13	31.51	11.67
91	Aide without children	15.37	28.76	10.16	12.61
92	Aide with one child	18.05	30.56	18.19	18.41
93	Aide with two children	9.98	25.43	6.94	8.96
94	Aide with small group	12.07	21.22	44.89	25.41
95	Aide with large group	13.99	29.54	17.59	21.10
96	Overall aide occurences	14.67	19.47	16.58	11.59
97	Volunteer without children	17.20	30.23	42.60	43.15
98	Volunteer with one child	19.38	29.93	8.52	17.19
99	Volunteer with two children	4.89	13.20	3.36	9.76
100	Volunteer with small group	13.44	25.50	7.23	18.15
101	Volunteer with large group	20.09	30.20	0.52	3.01
102	Overall volunteer occurences	15.00	24.48	4.33	6.46
103	Adult without children	17.76	18.03	11.30	9.98
104	Adult with one child	10.63	14.08	14.56	11.72

Variable Number	Description	Follow Through (N=58)		E C E (N=45)	
		$\bar{X}$	SD	$\bar{X}$	SD
105	Adult with two children	2.78	3.44	4.22	4.24
106	Adult with small group	13.75	10.18	31.20	14.24
107	Adult with large group	55.08	23.70	38.71	18.28
108	Overall occurences of adults	92.19	33.93	52.42	18.61
109	One child with any adult	.81	1.35	1.13	1.24
110	Two children with any adult	.43	.73	1.13	3.94
111	Small group of children with any adult	5.38	4.45	10.43	18.84
112	Large group of children with any adult	65.48	22.37	44.13	16.88
113	Overall occurence of children with any adult	72.09	18.96	56.82	23.82
114	One child independent	1.68	2.39	4.59	16.69
115	Two children independent	1.85	2.80	6.45	23.63
116	Small group of children independent	9.10	11.44	14.14	21.26
117	Large group of children independent	15.28	13.08	18.00	12.10
118	All children independent	27.91	18.96	43.18	23.82
119	Number of children in the classroom times the number of CCLs	969.92	286.27	819.11	281.81
120	One child with teacher/Math	.41	1.00	0.77	1.17
121	Two children with teacher/Math	.22	.75	0.36	1.00
122	Small group with teacher/Math	2.77	5.29	6.14	8.14
123	Large group with teacher/Math	65.13	30.13	28.66	31.39
124	One child with aide/Math	.27	.82	0.70	1.58
125	Two children with aide/Math	.08	.35	0.52	1.57
126	Small group with aide/Math	.87	4.21	4.04	27.60
127	Large group with aide/Math	.72	4.32	3.24	8.02
128	One child with volunteer/Math	.57	2.65	0.44	1.24
129	Two children with volunteer/Math	.03	.18	0.11	0.44
130	Small group with volunteer/Math	1.43	4.58	0.30	1.04
131	Large group with volunteer/Math	3.42	12.87	0.11	0.74
132	One child with any adults/Math	1.25	3.45	1.91	2.43
133	Two children with any adults/Math	.33	.96	0.99	1.95
134	Small group with any adults/Math	5.06	8.40	10.48	30.13
135	Large group with any adults/Math	69.27	29.13	32.01	33.12
136	One child independent/Math	1.24	2.86	11.42	52.81
137	Two children independent/Math	1.75	4.59	16.31	79.21
138	Small group of children independent/Math	7.39	14.82	7.50	100.09
139	Large group of children independent/Math	13.71	16.64	19.37	24.78
140	Approximate number of children involved in Math--all days observed	213.92	135.28	118.57	67.49

Variable Number	Description	Follow Through (N=58)		E C E (N=45)	
		X̄	SD	X̄	SD
141	Personalized instruction in Math	1.58	4.24	2.91	3.48
142	All children independent/Math	24.09	23.10	54.60	41.93
143	One child with teacher/Reading	.36	.66	0.87	2.18
144	Two children with teacher/Reading	.26	.63	-0.16	2.99
145	Small group with teacher/Reading	5.64	5.63	16.52	16.94
146	Large group with teacher/Reading	56.53	27.99	24.27	21.17
147	One child with aide/Reading	.17	.60	0.72	0.91
148	Two children with aide/Reading	.01	.06	0.33	3.36
149	Small group with aide/Reading	.72	1.78	11.46	11.75
150	Large group with aide/Reading	.19	.84	2.58	5.44
151	One child with volunteer/Reading	.12	.46	0.21	0.62
152	Two chilren with volunteer/Reading	.07	.27	0.17	0.52
153	Small group with volunteer/Reading	.95	1.92	0.92	2.34
154	Large group with volunteer/Reading	2.37	8.26	0.14	0.93
155	One child with any adults/Reading	.65	1.21	1.81	2.87
156	Two children with any adults/Reading	.34	.89	0.34	6.23
157	Small group with any adults/Reading	7.31	6.94	28.90	24.26
158	Large group with any adults/Reading	59.10	27.44	27.00	22.77
159	One child independent/Reading	1.31	2.84	1.64	5.39
160	Two children independent/Reading	1.68	3.09	2.54	7.80
161	Small group of children independent/Reading	9.95	12.50	22.86	19.01
162	Large group of children independent/Reading	19.67	17.88	14.92	17.09
163	Approximate number of children involved in Reading--all days observed	466.12	206.28	279.18	143.33
164	Personalized instruction in Reading	.99	1.95	2.14	8.34
165	All children independent/Reading	32.61	21.95	41.96	21.35
166	One child with teacher/Social Studies	.06	.24	0.10	0.54
167	Two children with teacher/Social Studies	0.00	0.00	0.00	0.00
168	Small group with teacher/Social Studies	.63	2.29	0.00	0.00
169	Large group with teacher/Social Studies	64.34	42.10	22.61	39.39
170	One child with aide/Social Studies	2.78	16.67	0.00	0.00
171	Two children with aide/Social Studies	0.00	0.00	0.00	0.00
172	Small group with aide/Social Studies	0.00	0.00	2.22	14.91
173	Large group with aide/Social Studies	.49	2.96	3.33	16.51

Variable Number	Description	Follow Through (N=58)		E C E (N=45)	
		$\bar{X}$	SD	$\bar{X}$	SD
174	One child with volunteer/ Social Studies	0.00	0.00	0.00	0.00
175	Two children with volunteer/ Social Studies	.19	1.16	0.00	0.00
176	Small group with volunteer/ Social studies	0.00	0.00	0.57	3.83
177	Large group with volunteer/ Social Studies	3.75	16.99	0.00	0.00
178	One child with any adults/ Social Studies	2.83	16.66	0.10	0.54
179	Two children with any adults/ Social Studies	.19	1.16	0.00	0.00
180	Small group with any adults/ Social Studies	.63	2.29	2.79	15.31
181	Large group with any adults/ Social Studies	68.58	41.67	25.94	42.23
182	One child independent/ Social Studies	.15	.63	2.47	14.92
183	Two children independent/ Social Studies	.15	.63	0.50	3.17
184	Small group of children independent/Social Studies	5.37	17.61	3.48	16.14
185	Large group of children independent/Social Studies	5.44	17.80	2.54	9.68
186	Approximate number of children involved in Social Studies--all days involved	76.99	68.80	23.51	51.65
187	One child with teacher/Science	.93	5.56	0.00	0.00
188	Two children with teacher/Science	0.00	0.00	0.00	0.00
189	Small group with teacher/Science	.54	2.82	1.11	7.45
190	Large group with teacher/Science	50.37	45.78	25.54	41.72
191	One child with aide/Science	0.00	0.00	0.00	0.00
192	Two children with aide/Science	0.00	0.00	0.00	0.00
193	Small group with aide/Science	0.00	0.00	0.00	0.00
194	Large group with aide/Science	2.78	16.67	2.80	10.77
195	One child with volunteer/Science	.93	5.56	0.00	0.00
196	Two children with volunteer/ Science	.64	3.86	0.00	0.00
197	Small group with volunteer/ Science	0.00	0.00	0.51	3.40
198	Large group with volunteer/ Science	2.59	12.34	0.00	0.00
199	One child with any adults/ Science	1.85	11.11	0.00	0.00

Variable Number	Description	Follow Through (N=58)		E C E (N=45)	
		$\overline{X}$	SD	$\overline{X}$	SD
200	Two children with any adults/ Science	.64	3.86	0.00	0.00
201	Small group with any adults/ Science	.54	2.82	1.62	8.12
202	Large group with any adults/ Science	55.74	46.51	28.33	45.10
203	One child independent/Science	2.54	6.71	2.53	15.01
204	Two children independent/Science	1.14	4.33	3.16	16.04
205	Small group of children independent/Science	1.95	7.16	1.58	8.02
206	Large group of children independent/Science	2.26	6.97	5.00	21.05
207	Approximate number of children involved in Science--all days observed	85.46	119.93	31.62	60.71
208	One child with teacher/Arts and Crafts	.16	.96	0.09	0.34
209	Two children with teacher/ Arts and Crafts	0.00	0.00	0.06	0.41
210	Small group of children with teacher/Arts and Crafts	1.33	5.06	1.88	6.38
211	Large group of children with teacher/Arts and Crafts	26.77	42.73	17.95	33.50
212	One child with aide/ Arts and Crafts	2.89	16.66	0.18	0.72
213	Two children with aide/ Arts and Crafts	.32	1.92	0.10	0.51
214	Small group of children with aide/Arts and Crafts	.67	4.00	1.79	7.42
215	Large group of children with aide/Arts and Crafts	0.00	0.00	1.89	6.49
216	One child with volunteer/ Arts and Crafts	.04	.25	0.02	0.12
217	Two children with volunteer/ Arts and Crafts	0.00	0.00	0.00	0.00
218	Small group of children with volunteer/Arts and Crafts	0.00	0.00	0.35	1.65
219	Large group of children with volunteer/Arts and Crafts	3.65	13.66	0.00	0.00
220	One child with any adults/ Arts and Crafts	3.05	16.66	0.29	1.02
221	Two children with any adults/ Arts and Crafts	.36	1.93	0.16	0.64
222	Small group of children independent/Arts and Crafts	2.00	6.31	4.02	9.73

Variable Number	Description	Follow Through (N=58)		E C E (N=45)	
		$\bar{X}$	SD	$\bar{X}$	SD
223	Large group of children with any adults/Arts and Crafts	30.43	43.28	19.83	34.05
224	One child independent/Arts and Crafts	7.40	23.46	4.80	10.82
225	Two children independent/Arts and Crafts	2.92	7.28	7.25	18.59
226	Small group of children independent/Arts and Crafts	18.15	33.51	19.52	28.35
227	Large group of children independent/Arts and Crafts	7.92	19.90	13.02	29.50
228	Approximate number of children involved in Arts/Crafts--all days observed	42.21	54.97	41.49	44.87
229	Teacher involved/Classroom Management	8.30	10.75	5.00	5.63
230	Aide involved/Classroom Management	2.68	6.73	2.68	4.27
231	Volunteer involved/Classroom Management	3.48	9.37	0.07	0.48
232	Among adults/Social Interaction	.39	.85	5.61	7.10
233	Among adults and children/ Social Interaction	1.45	3.71	0.52	1.14
234	Among chilren/Social Interaction	3.04	5.57	5.16	7.05
235	Between observer and children/ Social Interaction	1.30	3.08	5.61	7.10
236	TV/Academic Activities	1.14	4.03	4.77	5.56
237	Audio visual equipment/Academic Activities	5.94	12.42	3.31	6.52
238	Exploratory materials/Academic Activities	1.90	4.16	3.32	8.54
239	Math or Science equipment/ Academic Activities	2.97	5.79	47.92	21.82
240	Texts, workbooks/Academic Activities	65.84	25.18	16.38	19.84
241	Puzzles, games/Academic Activities	4.12	6.99	11.36	14.99
242	Percent CCLs in which an academic activity is occurring	87.91	8.32	67.64	13.72
243	Lunch, snack/Longitudinal	0.00	.01	0.00	0.01
244	Group time/Longitudinal	.03	.04	0.07	0.08
245	Story, music, dancing/Longitudinal	.06	.06	0.03	0.05
246	Arts, crafts/Longitudinal	.06	.07	0.13	0.15
247	Guessing games, table games, puzzles/Longitudinal	.03	.05	0.10	0.13

Variable Number	Description	Follow Through (N=58)		ECE (N=45)	
		$\overline{X}$	SD	$\overline{X}$	SD
248	Numbers, math, arithmetic/ Longitudinal	.27	.10	0.25	0.13
249	Reading, alphabet, language development/Longitudinal	.57	.13	0.49	0.15
250	Social studies, geography/ Longitudinal	.06	.04	0.03	0.06
251	Science, natural world/ Longitudinal	.07	.09	0.05	0.07
252	Sewing, cooking, pounding/ Longitudinal	.01	.01	0.01	0.04
253	Blocks, trucks/Longitudinal	.01	.01	0.00	0.02
254	Dramatic play, dress-up/ Longitudinal	.01	.02	0.00	0.02
255	Active play/Longitudinal	.02	.05	0.06	0.07
256	Practical skills acquisition/ Longitudinal	0.00	.01	0.01	0.04
257	Teacher with one child, academic activities/Longitudinal	.07	.12	0.11	0.12
258	Aide with one child/ academic activities/Longitudinal	.04	.13	0.08	0.11
259	Volunteer with one child, academic activities/Longitudinal	.03	.13	0.03	0.08
260	Children independent, academic activities/Longitudinal	3.92	3.07	4.74	2.82
261	Any adult with one child, any activity/Longitudinal	.18	.29	0.25	0.22
262	Average number of adults in the classroom/Longitudinal	1.39	.57	1.29	0.36
341	Child to adult, all verbal	11.89	4.05	12.46	2.78
342	Adult to child, all verbal	28.85	7.98	22.63	4.90
343	Child to adult, all verbal except response	3.24	2.44	4.48	2.36
344	Individual child verbal with adult	26.60	9.59	28.46	6.72
345	Verbal interactions among children	1.89	3.01	0.03	0.01
346	Child commands, requests, and direct questions, nonacademic	.82	.83	0.89	0.67
347	Child commands, requests, and direct questions, academic	.75	.67	1.02	0.89
348	Child open-ended questions, nonacademic	.01	.02	0.00	0.02
349	Child open-ended questions, academic	0.00	.01	0.00	0.01
350	Child questions to adults	1.45	1.14	1.92	1.33

Variable Number	Description	Follow Through (N=58) X̄	Follow Through (N=58) SD	E C E (N=45) X̄	E C E (N=45) SD
351	Adult commands, requests, and direct questions to groups of children, nonacademic	1.35	.95	0.66	0.40
352	Adult commands, requests, and direct questions to individual children, nonacademic	1.87	1.02	2.40	1.09
353	Adult commands, requests, and direct questions to groups of children, academic	2.07	1.25	1.43	1.05
354	Adult commands, requests, and direct questions to individual children, academic	4.26	2.46	3.24	1.45
355	Adult open-ended questions to children, nonacademic	.13	.19	0.04	0.09
356	Adult open-ended questions to children, academic	.26	.35	0.03	0.07
357	All adult questions to children	9.94	2.98	7.79	2.08
358	All child responses	11.71	3.67	9.65	2.07
359	Child responses, nonacademic	3.49	1.89	3.27	1.35
360	Child responses, academic	7.32	3.43	6.38	2.25
361	Child responses to behavioral correction of reinforcement	.89	.75	0.01	0.01
362	Individual child responds to adult academic command, request, or direct question	3,74	2.18	2.43	1.12
363	Child group responds to adult academic command, request, or direct question	1.25	.83	0.81	0.69
364	Adult responses to child requests or questions, academic	.59	.56	0.96	0.86
365	Adult responses to child requests or questions, nonacademic	.66	.61	0.86	0.62
366	Adult responds to child question with open-ended question	0.00	.01	0.00	0.00
367	Adult responds to child question with direct question	.09	.16	0.12	0.14
368	Child responds to adult open-ended question	.34	.35	0.05	0.09
369	Child extended response, nonacademic	.09	.11	0.11	0.16
370	Child extended response, academic	.49	.72	0.28	0.38
371	Child extended response to adult open-ended question	.02	.04	0.01	0.05

Variable Number	Description	Follow Through (N=58)		E C E (N=45)	
		$\overline{X}$	SD	$\overline{X}$	SD
372	Child presenting information to a group	.27	.97	0.00	0.00
373	Adult instruction, nonacademic	3.05	3.04	0.96	1.23
374	Adult instruction, academic	6.93	4.66	4.05	2.87
375	Adult instructs individual child	2.53	3.00	2.15	1.54
376	Adult instructs a group	7.44	5.35	2.86	2.59
377	Child self-instruction	.04	.11	0.00	0.00
378	Child self-instruction, academic	.03	.08	0.00	0.00
379	Child self-instruction, objects	.01	.04	0.00	0.00
380	Child self-instruction, academic, with objects	0.00	0.00	0.00	0.00
381	Child instructing other children	.27	.97	0.00	0.00
382	Child task persistence	0.00	0.00	0.00	0.00
383	Two children using concrete objects together	0.00	0.00	0.00	0.00
384	Small group using concrete objects together	0.00	0.00	0.00	0.00
385	Social interaction among children	.62	1.37	0.00	0.00
386	Child task-related comments to children	.73	1.87	0.00	0.01
387	Child general comments to adults	.40	.62	0.36	0.42
388	Child task-related comments to adults	1.24	1.15	2.28	1.78
389	Adult general comments to children	.65	.82	0.75	0.76
390	Adult task-related comments to children	1.39	1.69	2.07	1.39
391	Child acknowledgement	.04	.14	0.03	0.06
392	Child praise	0.00	.01	0.00	0.00
393	Child corrective feedback	.02	.04	0.05	0.01
394	All adult acknowledgment to children	2.39	1.61	2.36	1.30
395	Adult acknowledgment to children, academic	1.77	1.39	1.69	1.17
396	Adult acknowledgment to children, behavior	.01	.03	0.00	0.00
397	Adult acknowledgment to children, other task-related	.60	.56	0.65	0.42
398	All adult praise to children	.67	.59	0.49	0.53
399	Adult reinforcement with token, academic	0.00	.02	0.00	0.00
400	Adult reinforcement with token, behavior	0.00	0.00	0.00	0.00
401	Adult reinforcement with token, other task-related	0.00	.02	0.00	0.00

Variable Number	Description	Follow Through (N=58) $\bar{X}$	Follow Through (N=58) SD	E C E (N=45) $\bar{X}$	E C E (N=45) SD
402	Adult praise academic	.47	.47	0.00	0.00
403	Adult praise, behavior	.01	.02	0.00	0.00
404	Adult praise, other task-related	.19	.35	0.11	0.14
405	All adult corrective feedback to children	3.78	1.85	3.34	1.79
406	Adult positive corrective feedback, academic	1.22	1.01	1.64	1.25
407	Adult negative corrective feedback, academic	.01	.04	0.00	0.01
408	Adult positive corrective feedback, behavior	.39	.28	0.00	0.01
409	Adult negative corrective feedback, behavior	.18	.23	0.00	0.00
410	Adult positive corrective feedback, other task-related	.21	.31	0.21	0.25
411	Adult negative corrective feedback, other task-related	.02	.05	0.00	0.01
412	Adult feedback for child response to adult academic command, request, or direct question	1.83	1.27	1.10	0.80
413	Child not responding to adults	.45	.40	0.00	0.00
414	Adult not responding to child	.07	.09	0.02	0.07
415	All children waiting	0.00	0.00	0.00	0.00
416	Children attentive to adults, nonacademic	.06	.17	0.01	0.03
417	Children attentive to adults, academic	.09	.30	0.01	0.04
418	Adults attentive to children, nonacademic	4.64	5.11	1.68	1.53
419	Adults attentive to children, academic	6.09	5.70	3.52	2.49
420	Adults attentive to small group	.46	.70	0.04	1.15
421	Adults attentive to individual child	4.60	2.97	3.24	2.43
422	Positive behavior among children	.26	1.13	0.00	0.00
423	Positive behavior--adults to children	.48	.63	0.31	0.57
424	Positive behavior, children to adults	.25	.25	0.23	0.42
425	Child expressions of unhappiness	.04	.05	0.84	0.88
426	Adult expressions of unhappiness	.03	.12	4.04	4.81
427	Negative behavior among children	.01	.03	0.00	0.00
428	Negative behavior, adults to children	.25	.27	0.08	0.12

Variable Number	Description	Follow Through (N=58)		E C E (N=45)	
		$\bar{X}$	SD	$\bar{X}$	SD
429	Negative behavior, children to adults	.03	.06	0.00	0.07
430	Total adult affect	.75	.68	5.46	4.68
431	Total child affect	.59	1.13	1.36	0.98
432	Adult punishment of children	.07	.10	0.00	0.01
433	Child statements of self-worth	.04	.06	0.13	0.23
434	Dramatic play, pretending	.17	.63	2.68	1.69
435	Total academic verbal interactions	37.41	12.99	31.29	9.57
436	Total interactions, behavior control	2.23	1.56	0.01	0.02
437	Children engaged in mutual activity	.43	.94	0.00	0.00
438	Adult communication/attention focus: one child	21.82	6.63	18.76	4.52
439	Adult communication/attention focus: two children	.52	.94	0.53	0.48
440	Adult communication/attention focus: small group	2.21	2.24	4.18	2.63
441	Adult communication/attention focus: large group	17.09	7.92	2.72	3.16
442	All child nonverbal	4.24	2.37	2.35	1.06
443	Child movement	1.16	1.01	3.84	1.28
444	Adult movement	3.68	2.49	10.21	5.35
445	Adult leaving room	.01	.02	0.00	0.00
446	Child attentive to machine	1.24	4.04	0.00	0.00
447	Adult neutral corrective feedback, other task-related	.31	.69	0.04	0.06
448	Adult neutral corrective feedback, behavior	.67	.70	0.00	0.00
449	Adult neutral corrective feedback, academic	.74	1.04	0.51	0.41
450	All child open-ended questions	.01	.02	0.01	0.02
451	Adult academic commands/requests and direct questions to children	6.33	3.07	4.67	1.98
452	All adult open-ended questions to children	.39	.39	0.07	0.11
453	Adult response to child's question with a question	.09	.17	0.12	0.14
454	Child's extended response	.60	.74	0.41	0.48
455	All adult instruction	9.98	5.76	5.01	3.41
456	All child task-related comments	1.97	1.99	2.29	1.78
457	All adult positive corrective feedback	1.83	1.13	1.84	1.35

Variable Number	Description	Follow Through (N=58)		E C E (N=45)	
		$\bar{X}$	SD	$\bar{X}$	SD
458	All adult negative corrective feedback	.22	.26	0.00	0.01
459	All adult praise for academic responses	.48	.47	0.36	0.47
460	All child positive affect	.51	1.11	0.23	0.42
461	All child negative affect	.04	.06	0.01	0.02
462	All positive behavior	.99	1.29	0.52	0.96
463	All negative behavior	.29	.30	0.09	0.12
464	Child attentive to adults or machine	1.39	4.03	0.02	0.08
465	Adult feedback to children for behavior	1. 27	.91	0.02	0.05
466	Child self-esteem	6.53	4.13	1.42	0.72
467	Child cooperation	1.44	2.59	0.00	0.01
468	Child self instruction, non-academic	.01	.04	0.00	0.00
469	All adult reinforcement with tokens	.01	.03	0.00	0.00
470	All adult neutral corrective feedback	1.71	1.71	0.55	0.43
471	Adults attentive to large group	5.67	4.30	0.92	1.14